Gleanings in Bee Culture

Created to help beekeepers succeed

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Beekeeping in Hawaii

By J. E. Eckert, Davis, California

A beautiful setting for an apiary in the rain belt on the island of Molokai. The trees in the background are eucalyptus. Near the hives are Monterey cyprus and an occasional ironwood seedling. The bees were placed on the location so they could take advantage of the eucalyptus bloom in the fall and winter seasons.

Late in 1948 I received a letter asking for advice on a beekeeping situation which had developed on the island of Molokai. In the succeeding exchange of information I found it necessary to refer to available literature on the beekeeping industry of the Hawaiian Islands and my interest in the specific problem and in the possibilities for research in the control of American foulbrood increased. Through a fortunate chain of circumstances, I was given permission by the University of California, to visit Molokai in order to arrange for a cooperative experiment which might be of considerable benefit to our beekeeping in California.

Beekeeping on the island of Molokai had been started by a few individuals many years before it was developed into a commercial industry by the Molokai Ranch. This

The remains of an extracting house on one of the early beekeeping locations on Molokai. The honey tank, extractor, uncapping knife, honey tins, and supers were where they had been left many years before the picture was taken.

company became interested in bees in about 1900 and increased over a period of years to around 2400 colonies. These produced an average of about 2000 cases of honey for a number of years, a rather profitable business especially in years when the honey sold for 12 to 15 cents a pound. American foulbrood finally became established in their apiaries in the early 30's and in 1937 and 1938 they burned all but about 200 colonies in an attempt to eliminate the disease. At that time they had some 27 apiary sites, at many of which extracting houses were located. A large central warehouse had also been built in Kaunakakai to take care of the honey and the rendering of combs and cappings. Thousands of supers, tops, bottoms, and frames were salvaged and stored in another warehouse. Three large solar extractors, 21 feet long by 6 feet wide, and several smaller ones gave mute evidence of a once thriving industry.

Between 1938 and 1949 the concession had not been developed and it was a question as to whether it could be revived or whether it should be closed out entirely. The colonies had swarmed and their swarms had swarmed until the entire island was well covered with bees. An examination of 86 of the remaining colonies revealed that 13 were infected with American foulbrood. From this it was assumed that the wild swarms might also be infected to a considerable extent. From a distance it looked like an excellent opportunity to try out the efficacy of sodium sulfathizole on a large scale, on an isolated island, as a means of reviving the industry.The manager of Molokai Ranch, Ltd., J. D. Fitzgerald, decided that it was worth the effort to put the business on a paying basis and engaged Mr. Allen Luce, a recent graduate of the University of California, to undertake the task.

Soon after Mr. Luce took over the job in the summer of 1949 he reinspected the colonies and found that some of those which had been diseased earlier, showed no evidence of the disease at the time of his inspection. This led us to believe, or at least to hope, that the colonies had developed some resistance to the disease. I looked forward to obtaining further proof of this possibility, as well as to the experiments in the chemical control of AFB when I made my first trip to Molokai in the fall of 1949.

An inspection of an abandoned apiary near Kaunakakai revealed that the colonies had been requeened with mainland stock two years before. Thirty five or so colonies had been divided and queens introduced into one or both of the divisions, and then neglected. Several of the colonies were diseased and many had died, their combs destroyed by the wax moth and in some cases other swarms had reestablished themselves in the hives. This indicated that American foulbrood was still a virulent disease on the island, especially in the main-

land strain of bees recently introduced.

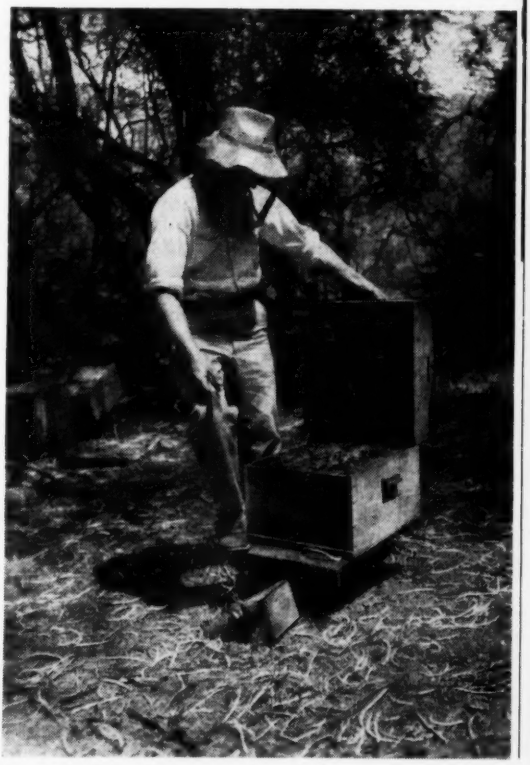
We placed infected combs in two colonies at Kaunakakai and though they became infected, they recovered and remained free of disease. This influenced a change of plans in favor of selective breeding to produce a resistant strain rather than to control the disease by chemical means. This seemed more logical because none of the many wild swarms which were caught during 1949 or which were taken from trees, cliffs, or elsewhere, had shown any evidence of AFB, and only one mild infection had been found at the fall inspection of the established colonies.

During the visit I took advantage of the opportunity to become more familiar with floral conditions and beekeeping problems on both Molokai and on Oahu. I found the color

This colony had been divided with an inner cover. queens introduced into the divisions, and then neglected. Both divisions had died, possibly from disease, and the wax moth had destroyed all of the combs.

and hospitality of the islands surpassed all of my previous expectations and I enjoyed every minute of the time, including the travel by air.

On my return, I brought back 12 queens of the Molokai strain of bees and after preserving the attendant workers, introduced the queens into our experimental colonies of the University of California, at Davis. Six of the queens survived the introduction and the winter period and their colonies were tested in the spring for resistance to American foulbrood by inserting into each colony a comb containing several hundred scales of the disease. Five of the six showed a definite amount of resistance to the disease and two of them were selected by Dr. H. H. Laidlaw for foundation breeding stock from which to produce queens whose colonies would be more resistant to AFB and for use as breeding stock on Molokai.



Mr. Luce examines the lone colony remaining on an abandoned location in a forest of kiawe trees.

A Molokai Ranch apiary is now in a thriving condition in a kiawe forest.

An examination of the attendant bees brought with the queens indicated a rather high infection of **Nosema apis,** and this occurrence had to be taken into consideration as another problem with which Mr. Luce would have to contend.

With this experience as a background, I was quite pleased to receive, in the summer of 1950, an invitation to make a survey of the beekeeping industry throughout the territory of Hawaii. This was made possible when the project was sponsored by the Industrial Research Advisory Council of Hawaii. This committee was appointed by the territorial legislature to investigate the possibilities of increasing employment in the islands by the development of minor industries. The committee worked closely with the University of Hawaii in matters pertaining to agriculture and Dr. Henry A. Bess, chairman of the Division of Entomology of that University was responsible for the project and cooperated fully in carrying it out. Mr. Baron Goto and other members of the agricultural extension service arranged for field contacts and meetings and were most cooperative in many ways.

The survey could have extended over a period of at least three months but due to previous commitments, I had to concentrate the work in a period between September 19, when I landed in Honolulu, and November 24 when I left for home aboard the United Air Lines. In that period I visited five of the six islands, some of them more than once. I met a majority of the beekeepers, studied their beekeeping methods and problems, took a census of their colonies and production, examined 1,336 colonies out of 8,880 tabulated, and visited many areas to determine their present and future beekeeping possibilities.

A review of the available literature on beekeeping in Hawaii was consulted in order to get informa-

tion on the history and economics of the industry, the past history of the bee diseases, data on the importation of queens, etc. Dr. Bess assumed much of the responsibility for this phase of the project, as well as to look into the question of the parasites of the wax moth. He also joined me in my visits to some of the beekeepers and took a few unaccustomed stings as his reward.

Historical. A review of the history of beekeeping in Hawaii indicated that bees may have been introduced into the territory in 1857 and that the industry had grown and reached a peak of production by 1918 when 2,432,893 pounds of honey and 30,252 pounds of beeswax were shipped to the United States. During the next 23 years, the imports to the mainland averaged around 1,331,887 pounds of honey and 28,943 pounds of beeswax. The annual production thereafter, as indicated by imports of honey into the United States varied from 353,622 to 724,922 pounds.

Bee diseases, and particularly American foulbrood, evidently played an important role in the decline of the industry. In 1909, Dr. E. F. Phillips reported that the foulbrood diseases were not known to be present in the islands at the time of his visit (in 1908). When or how they were first introduced could not be determined but some of the older beekeepers thought it was through the importation of used and unwashed 60-lb. honey containers. Losses from some brood diseases were first experienced on Kauai, and probably on Oahu by 1926, and the disease was determined later that year as American foulbrood. In 1932, the colonies on Oahu were inspected and several hundred diseased hives were burned. By that time the disease had also spread to the islands of Maui, Hawaii, and possibly to Molokai. Some of the larger honey companies operated on several of the islands and it is easy to see how the disease could have been carried from one island to another in used beekeeping equipment or by the transfer of colonies. Thousands of colonies were destroyed by disease and by fire on Kauai, Maui, and Hawaii in 1935 and 1936 and on the island of Molokai in 1937 and 1938. Only a few "sick" colonies were burned on the island of Lanai. Many of the larger honey companies did not replace the destroyed colonies.

The current survey indicated that there are less than 10,000 colonies, in hives, on the different islands (see Table 1). Of this number, about 2,200 are located on the privately owned island of Niihau which I did not have the privilege of visiting. E. S. Robinson, the manager, stated to me that American foulbrood has never been known to be present on Niihau. His quarantine measures against the use of outside bees, honey, and used equipment might prevent that island's colonies from becoming infected with this dire disease.

Condition of the Colonies and Equipment

On the island of Molokai, the Molokai Ranch is equipping all of its colonies with wired frames and full sheets of comb foundation. The hives are painted with aluminum paint and the equipment is as modern as in the better apiaries here on the mainland. Just recently they have acquired a portable extracting outfit, built in a house trailer by a California beekeeper and composed of an 8-frame extractor operated by a gasoline motor, a steam boiler, cappings press, automatic uncapping knife, honey pump, honey

Table 1. Summary of Statistics on Beekeeping in Hawaii - 1950*

Island	Number of Colonies	Number of Apiaries	No. Inspected Apiaries	No. Inspected Colonies	Colonies with AFB	Production in 1950 Honey	Production in 1950 Wax
Hawaii	650	11	9	129	13	96,310	1,760
Kauai	1,817	25	21	156	18	120,060	2,000
Lanai	185	4	4	105	0	10,000	200
Maui	1,906	17	11	339	10	190,560	3,175
Molokai	527	15	14**	489	14	20,000	1,220
Niihau	2,200	24	0	0	0	240,000	5,000
Oahu	1,595	20	9	118	0	83,660	1,900
Grand Total	8,880	116	67	1,336	55	760,590	15,255

* The total number of colonies and production given by owners.
**Eight of these colonies were infected for experimental purposes.

XUM

Swarms frequently build large clusters of combs in the open. Temperature conditions are favorable but they frequently die from lack of stores, undoubtedly because of the exposed combs being robbed by other bees.

sump, etc. They expect to set up modern honey storage and processing equipment in a centrally located plant to take care of the honey from their outyards. Some of their yards will be operated from this central plant. The honey flora on Molokai may be sufficient to support between 2,400 and 3,000 colonies.

On practically all of the other islands, a majority of the combs are unwired and extracting is done in small houses, sometimes in tents, at each apiary. Some of the beekeepers use gasoline motors to run their extractors, but many still use hand-operated extractors. A majority of the beekeepers use cold knives in uncapping the combs for extracting.

Most of the beekeepers and their helpers are Japanese. Some of them have helped with bees in the Islands for 30 or more years. A majority of them make their own foundation which is generally heavier than that produced by the modern sheeting machines. It takes a heavier sheet of wax when the foundation is used in unwired frames. As a general rule, the combs in the brood chambers contained many square inches of drone brood and old, granulated honey. Queen excluders were used in all of the apiaries examined and were placed over the first brood chamber. The beekeepers generally used a full complement of combs in the brood chamber but two less the capacity in the supers. The super combs were composed largely of self-built combs which contained a large percentage of drone cells. Some were built on full sheets of foundation in unwired frames.

Unwired frames were said to be necessary because of the quick granulating quality of the kiawe or algaroba honey. This is the principal source of honey in the Islands and will granulate within three or four weeks after it is stored in the comb. Honey must be extracted every three or four weeks and although some beekeepers extract every two or three weeks, some of the honey still granulates before it can be extracted.

Both eight and ten frame hives are used, and most beekeepers operate their colonies in two-story hives. Some colonies are run in three or four stories, but this is the exception rather than the rule. The poor combs in the brood chamber and the poorer combs in the supers produce weak colonies and limit the interchange of combs. Some of the apiarists inspect their colonies regularly and practice a system of requeening their colonies at intervals, but a majority of the beekeepers follow no system of requeening and simply let Nature take its course through swarming and supersedure. The combination of poor combs and no system of maintaining good queens, produces a condition wherein many of the colonies are non-producers, or produce much less than the better colonies.

Swarming is quite prevalent throughout the territory, induced by the limited brood nest and the poor brood combs. The practice of having the bees draw out a num-

A group of toads waiting for a meal of bees in an apiary on Kauai. The bean pods have dropped from the kiawe trees. The hive stands affords the colonies protection from ants.

ber of combs from starters or from a ridge of old comb left in the frames when a comb of granulated honey was cut out, tends to reduce the amount of swarming. The great number of wild swarms on all of the islands indicated that only a small percent of the swarms were returned to hives. It was a rather common sight to find swarms with combs hanging in trees or in caves. Mr. Luce caught 200 swarms in decoy hives during the 1950 season and used them to produce honey and to increase the number of colonies. The capture of stray swarms in decoy hives will reduce the competition for available food sources.

Races of Bees

A majority of the colonies in the Islands are of the Italian race and many of the colonies are composed of beautifully and uniformly marked bees. Occasionally, one encounters a black bee which resembles closely the Caucasian and Carniolan races. Measurements of tongue length indicated that at least some of these blacks are Caucasians. Most of the colonies on the island of Hawaii are of the black race. Some of them are nervous in behavior, like the old German blacks, but a majority are fairly quiet and gentle. Of course, many of the colonies are composed of hybrids. Considerable improvement in the color, behavior, production, and strength of colonies could be effected by the use of a systematic method of requeening the colonies from selected breeders by modern methods of requeening. It would seem highly desirable for the beekeepers to do so and to use their own stock, rather than to import queens from the mainland, in order to take advantage of their isolation to increase the resistant factor to American foulbrood. Some of the beekeepers were familiar with the modern methods of rearing queens but few practiced such methods.

Placement of Hives

Most apiaries were located in the partial shade of the kiawe trees or in the shade of trees in other locations. This is desirable because the sun is warm and combs built in unwired frames will sag with heat quicker than those in wired frames. One apiary of some 200 colonies was located in the dense shade of mango trees and the bees, as a consequence, were cross and hostile. The owner stated that he had not looked into the brood chambers of the colonies in four or five years. I found no disease in that apiary.

Because of the ever present big headed ant, as well as the toad, colonies generally were placed on stands, boxes, or benches and a band of grease used to keep the ants from having access to the combs. When hives were placed directly on the ground, or on rocks, the bees had difficulty in keeping the ants out. This was true particularly with the weaker colonies. The ants carried off the honey and attacked both the brood and the adult bees.

Supering and Removing Surplus

Supers were added to the first story as soon as the bees had need for room if the colonies were win-

tered in one-story hives. The kiawe may start to bloom in April or May but the main nectar flow from this source does not occur until in June and July. The blooming period may extend through late summer or fall, depending on climatic factors. As stated previously, honey must be extracted every three or four weeks and even then, some of it granulates in the comb.

Honey is removed by the shaking and brushing treatment or by the smoke method. Some of the beekeepers have a unique method of smoking bees out of the supers of honey by setting the super on a hive body on the ground near the front of the hive. Two rolls of smoldering burlap are dropped into the hive body on the ground just before the super is set on top. The bees come boiling out of the hive within a few minutes or by the time the beekeeper has worked two or three other colonies in the same manner. The bees are then brushed off the tops of the frames and side walls of the super and the combs are then wheeled into the extracting house.

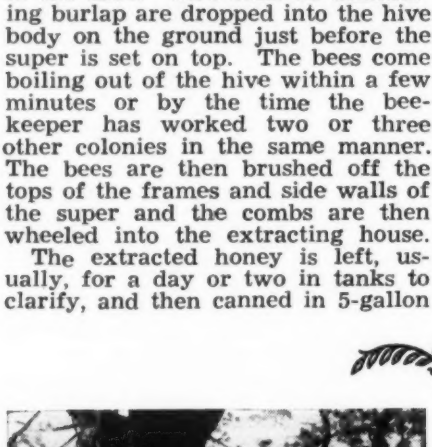
The extracted honey is left, usually, for a day or two in tanks to clarify, and then canned in 5-gallon tins. Some use steel barrels holding 50 gallons. These can be returned at a saving and used over again.

Fermented Honey

Sometimes the beekeepers have some trouble with the honey fermenting in the comb or in the can. This trouble is experienced generally in early spring or fall, when the air is cooler and the humidity is higher. It may occur when too many of the combs are extracted before they are entirely sealed. Fermentation occurs when the water content is greater than 17 percent and most frequently when the moisture is 20 percent or greater. It is caused by the sugar tolerant yeasts which are present in the nectar or which get into the honey. Granulated honey is more likely to ferment than liquid honey.

Thin honey will rise to the surface of the tank and will fill the last cans drawn from the tank and it is for this reason that only a portion of a crop may ferment. Honey may also absorb moisture from the air when the humidity is high, as during a rainy season.

(To be continued)



Our Cover Page

At Monticello, near Charlottesville, Va., stands a magnificent tree, marked "Linden, original". Whether Jefferson planted the tree, had it planted or jealously tended it, is not known but the old tree, still beautiful (April 30, 1951), is a tribute to the practical sagacity of the author of the Declaration of Independence, and third president of the United States. Jefferson believed in trees and he did his part in giving prominence to a tree the wood of which a substitute has never been found.

Eighty years ago A. I. Root, recognizing the value of the tree for lumber and for honey, did his best to call attention to the fact that it was gradually disappearing as a forest tree. He distributed thousands of seedlings, and planted seven acres of the tree known as Linden in Europe and as Basswood in America.

Jefferson foresaw the need of reforestation. He preached economy in government. It is unfortunate that we have fallen short of many of the Jeffersonian ideals.—H. H. Root.

Close up of the magnificent old basswood tree marked "Linden, original" on the spacious front lawn of Monticello. (See cover picture.)

Breeding Improved Honey Bees

II - Heredity and Variation

By William C. Roberts and Otto Mackensen
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(Continued from June)

Heredity is concerned with the transmission of characters from parent to offspring. Animals of one species resemble each other, and this resemblance is due to heredity. Variation between individuals within any given species may be due to heredity or environment or both.

The body of the honey bee, like that of all the higher animals, is made up of many cells. Each cell contains a sort of cell within a cell, which is called a **nucleus.** Within the nucleus are the many genes, which are the hereditary determiners of form and function of all the parts and organs of the body.

Let us begin with the unfertilized egg. The egg is one cell having one nucleus and one set of genes. The genes are arranged in the nucleus in definite linear order on a series of string-like structures called **chromosomes.** The position of each gene on a chromosome is called its **locus.** A sperm cell also contains a nucleus with a single set of chromosomes and genes.

In fertilization the sperm enters the egg and its nucleus unites with the nucleus of the egg. Thus the fertilized egg nucleus has two sets of chromosomes and hereditary determiners.

In the development of an individual from the fertilized egg, the egg cell first divides into two cells and then the two daughter cells divide again. This process continues until the adult consists of millions of cells. Each time a cell divides each gene duplicates itself and all the chromosomes split longitudinally into identical halves. These halves pass to opposite sides of the nucleus and the nucleus then divides into two. The cell then divides and each daughter cell gets one of these genetically identical nuclei. Each cell grows to the original size of its mother cell and the process of division is repeated. As growth proceeds there is an interaction between cells that determines the form and function of the body parts.

In the honey bee the queens and workers develop from fertilized eggs in this manner. Therefore, all the cells in their bodies contain two sets of chromosomes and genes and are said to be **diploid.** The drone, however, develops from an unfertilized egg, has only one set of chromosomes and genes in all the cells of its body, and is said to be **haploid.**

During development reproductive organs are formed in which certain cells are set aside for the production of germ cells, sperms, or eggs. In the formation of the egg a cell division occurs in which the chromosome behavior is different from that in the multiplication of body cells. As a result of this division the egg has only one member of each pair of chromosomes, or one set of chromosomes and genes as mentioned at the beginning of this discussion. This mechanism assures the maintenance of a constant number of chromosomes in the species.

In most organisms a similar reduction takes place in the formation of the sperm, but as the honey bee drone has only one set of chromosomes no reduction takes place.

In the formation of egg cells it is a matter of chance which member of a given pair of chromosomes reaches a given daughter cell. It receives an assortment of 16 chromosomes (one member of each pair) that might range from all those from the queen's mother to all from her father or any mixture of the two. The genes on one chromosome usually pass as a unit and are said to be linked. Frequently, however, parts of a pair of chromosomes exchange places, so that an egg cell may receive chromosomes that are partly of maternal and partly of paternal origin. This exchange is called crossing over and, of course, increases the possibilities for variation tremendously by making many combinations of genes possible.

The separation of genes going into daughter cells followed by the creation of new combinations by fertilization is called segregation and

*In cooperation with the Wisconsin Agricultural Experiment Station and Louisiana University.

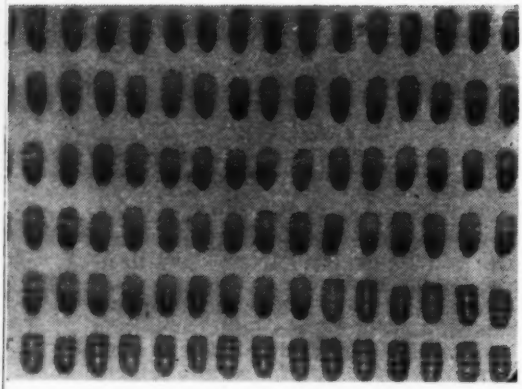

Fig. 1.—An inbred yellow queen artificially mated to a black drone produces worker progeny that are like neither parent but are banded intermediates. The first 4-½ rows are abdomens of her worker progeny. The last 1-½ rows are abdomens of drones produced by the yellow queen and are yellow like the queen because they develop from unfertilized eggs.

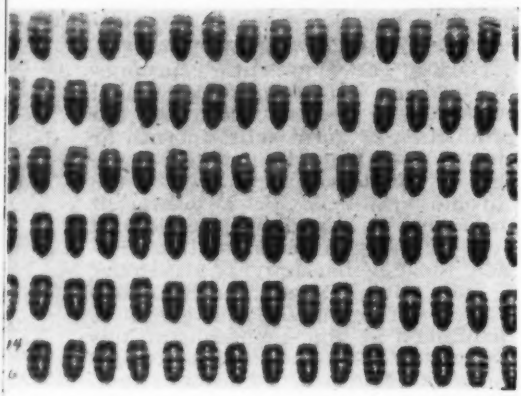

Fig. 2.—An F1 hybrid queen intermediate in color mated to a black drone produces progeny that range in color from intermediate to complete black.

recombination. This is the mechanism that brings about genetic variation between individuals in a family. Since in the honey bee all the sperms produced by a drone are identical, no variation between sisters(queens or workers) is introduced from the drone.

All the genes at a certain locus may be the same and have exactly the same effect in one individual as in another. Occasionally a gene may change so that it has a different effect. Such a change is called a **mutation.** Both the mutant and the parent gene are then referred to as **alleles.** The new allele multiplies in cell division and may become common in the bee population if it has a favorable action. There can be several alleles at a single locus.

Let us consider a simple case of alleles in the honey bee. It has been shown that the difference between a mutant white-eyed bee and the normal or wild-type black-eyed bee is due to the action of alleles at a single locus on one of the chromosomes. It has further been shown that the normal or wild-type allele for black eye is **dominant** to the mutant allele for white eye, which is then said to be **recessive.** A dominant gene masks the effect of its recessive allele.

In genetics it has become customary to denote genes by means of letters. The allele for black eyes may be designated by a capital **W**, since it is dominant, and the opposing recessive allele by **w**. One of these alleles is located at a particular locus on one of the chromosomes of all honey bee. Let us call this the **W** locus on chromosome number 1.

Since female honey bees have pairs of chromosomes, they can have any two of the alleles at this locus — **WW**, **Ww**, or **ww**. The **WW** and **Ww genotypes** (gene combinations) have black eyes, since **W** is dominant over **w**. The **ww** females have white eyes. Since drones have only one chromosome of each pair, they are either **W** (black eyes) or **w** (white eyes).

Inheritance of eye color in the female bee is thus duplicate and particulate. Each female receives either the **W** or **w** gene from its mother, and it also receives **W** or **w** from its drone father. Inheritance of eye color in the drone bee is particulate but not duplicate, for he receives either **W** or **w** from his mother since he does not have a father. The particulate nature of inheritance is illustrated by the gene **W** or **w**. In the drone if **W** is present the eye color is black, but it is white when the gene **w** is sub-

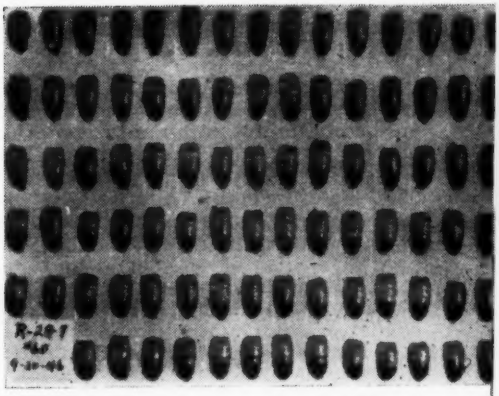

Fig. 3.—An F1 hybrid queen intermediate in color mated to a yellow drone produces progeny that range in color from intermediate to parental yellow.

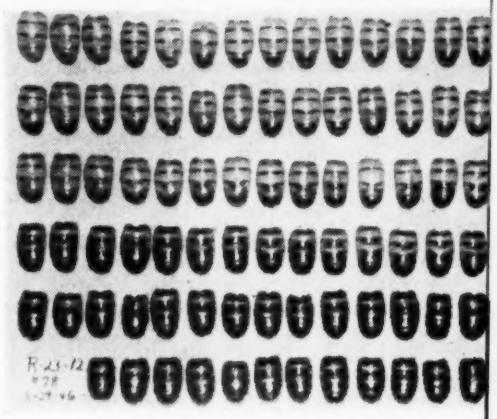

Fig.4.—Drones produced by F1 hybrid queens show gametic segregation for color. These range from yellow to complete black.

stituted for **W**.

If a queen bee has a **W** gene on both of her number 1 chromosomes, she is represented by the formula **WW** and is said to be **homozygous** for the **W** locus. Homozygosis means likeness of genes. The drone can never be said to be homozygous, because he has only one chromosome of each pair and thus only one of the alleles, **W** or **w**.

Let us assume that a black-eyed virgin queen homozygous for **W** is mated to a white-eyed drone. The mating can thus be represented as follows:

queen = **WW**
drone = **w**
WW x w = Ww

Since the queen is homozygous, **WW**, all her eggs will have a **W** gene. All sperms from the drone will have the gene **w**, and the female workers or queen offspring of such a mating will all be **Ww**, or heterozygous. Since **W** is dominant over **w** and all offsprings get one **W** and one **w**, the eyes of these females will be black.

Let us suppose that from one of these **Ww** fertilized eggs a virgin queen is produced. She will be **Ww**, or heterozygous for the **W** locus. Now let us mate her to a white-eyed drone that is thus **w**. Since the queen is **Ww**, she will produce eggs that will have only one of these alleles. On an average 50 percent of the eggs of such a queen will receive a **W** gene and the other 50 percent will receive the **w** gene. The mating and the offspring will be as follows:

queen = **Ww** eggs either **W** or **w**
drone = **w** sperm all **w**
Ww x W = 50 percent **Ww** heterozygous black-eyed females
50 percent **ww** homozygous white-eyed females

It can be seen that the heterozygous **Ww** black-eyed queen produces 50 percent of heterozygous black-eyed daughters and 50 percent of homozygous white-eyed daughters after mating to a drone that is white-eyed and thus **w**. Now this heterozygous black-eyed queen can produce both black-eyed and white-eyed sons, since her eggs have either a **W** or a **w**. Since these eggs can develop without fertilization, the **W** eggs will develop into black-eyed drones while the **w** eggs will develop into white-eyed drones. This illustrates how it is possible for a drone to exhibit and transmit to his offspring something that was not expressed in his mother, yet all his inheritance is from his mother because he has no father.

In the discussion of the **W** locus we have considered only two alleles, one completely dominant over the other. It is not always true that one allele is completely dominant. The heterozygous condition (such as **Ww**) may have intermediate effects. Furthermore, there can be several alleles of one locus that interact in various ways. When one considers that there may be thousands of loci with interaction of genes at different loci as well as interaction of alleles, it becomes apparent that the possibilities for genetic variation are tremendous.

Bees vary in many factors, not all of which are so easy to evaluate as eye color. It has been shown that there are at least seven different loci for genes that affect the color of the abdomen. Thus many abdominal color patterns are possible, since seven pairs of genes can produce 2187 different genotypes. If the workers of a mixed population are arranged according to color from the darkest to the lightest abdomen, they will fall into a continuous series.* Such a variation is said to be **continuous** in contrast to one such as white eye color, which is said to be **discrete.** In most characters of economic importance, such as honey production, egg-laying ability, vigor, or longevity, variation is continuous. Although such **variation may be due to the** interaction of a great many genes, it does not always imply a large number of inherited factors. It is possible that only a few genes are concerned and **that much variation is due to** environmental influences. These may be many and occur at various times **from the beginning of queen rearing** all the way through the life of the colony up to the time of harvesting the honey crop.

By a study of variation as such, we are never able to find out which part of the variation is certainly due to environment and which to heredity. The bee breeder must be ever alert and try to reduce the environmental variation to a minimum so that the variation he observes and upon which he bases his selection will be due to genetic factors. Queens in the colonies to be compared as to performance should be reared under optimum conditions. (Queen rearing will be treated more fully in a later paper.) It is best to place the colonies in a single yard so that they will all be exposed to the same weather conditions and will have the same forage available. At the beginning of a performance test they should be equalized as to bees, pollen, and honey so that none start the test under a handicap. Colonies should be scattered and isolated as much as possible to prevent drifting and robbing.

The colonial nature of the honey bee makes the selection of breeding individuals particularly difficult. In contrast to the situation in most farm animals, the colony rather than the individual is the unit of performance upon which the selection of breeding individuals must be based. The colony performance depends upon the performance of a queen of one generation and all her worker daughters of the next generation. We cannot breed this unit. We can in effect breed the queen by using her sons, because, as we have seen, they represent her germ cells. For breeding females we can only use virgin queens that are sisters to the workers of the colony.

It has frequently been stated that a beekeeper can improve his stock, even though he may know little about animal breeding, if he is willing to make the effort. Nevertheless, one cannot find conclusive evidence that much genetic improvement has been accomplished.

Among the principles of breed improvement employed by early plant and animal breeders were "like produces like or the likeness of some ancestor," "inbreeding produces prepotency or refinement," and "breed the best to the best." In following these principles why did the bee breeder fail to make the progress made by the early plant and animal breeders? Inadequate control of mating and the difficulty of recognizing genetic superiority of individuals were factors that hindered progress. There is yet another factor that adds complexity to bee breeding, which was not understood until very recently. This is the inheritance of sex determination, and it is a very important factor because it is associated with egg hatchability. The relationship of sex determination to bee breeding is the subject of the next article.

(To be continued)

* (Inheritance of abdominal coloration in two strains of honey bees is illustrated in figures 1, 2, 3, and 4.)

Experiments With a Cement Bee Hive

By Ann Moreton, Biloxi, Mississippi.

Cement bee hive designed and built by P. A Evans. It has been used successfully for the past three years.

For three years P. A. Evans, of Vancleave, Mississippi, has been testing out cement bee hives. Bees are his hobby and the commercial type hive has a very short life in the South. Mr. Evans got the idea for a cement hive by observing bees in the wild state, near Mark Twain Cave, Missouri, where he grew up, and with his brother they hunted wild bees. It was there that he noticed bees lived and apparently were healthy in the stone caves, and he wondered if bees would produce honey in cement hives.

It was 1947 before Evans got around to building a cement hive as an experiment. In the South the life of a wooden hive is about five years. He has 150 hives and replacements over a period of years is an expensive item. The difference in the cost of a cement hive and a commercial hive is noticeable. The cement mixture costs 50c against $2.00 for a commercial type. Evans designed and built his own mold and since that first hive three years ago he has replaced 20 of his wooden hives with cement ones. There would have been more replacements but his neighbors have kept him busy replacing their wooden hives!

"This is the way I made the hive", he explained, and stooping over he placed the pieces of wooden frame together. "I used 1 x 12 inch yellow pine boards to make an outside and

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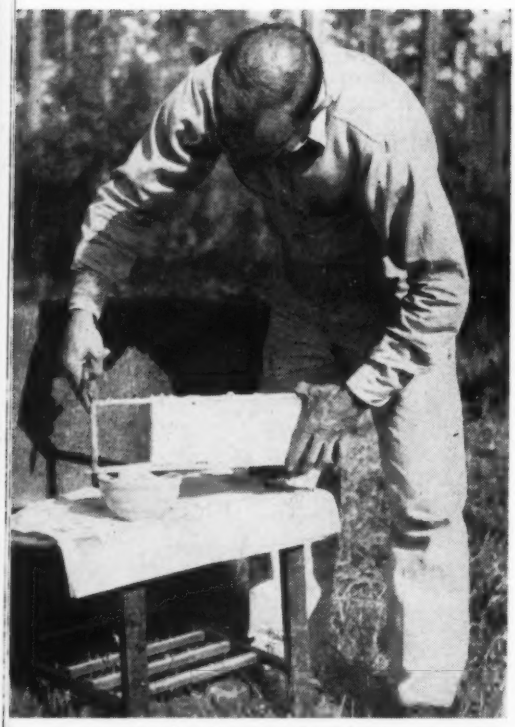


Mr. Evans cuts a square of honey from the frame of a cement hive. The bees produced as much honey in the cement hive as the wooden hive right next to it.

an inside frame, leaving space for the cement mixture in between that is exactly the same dimensions as the commercial hive." He pushed his hat far back on his head then went on, "Then I used a mixture of sand and cement, poured it in the frame and let it set for a week."

The cement hive was placed on a slab of concrete beside the regular wooden hives. The frames were put in and the bees started housekeeping. At the end of a year each colony produced 48 pounds of honey to each super, so actually the bees didn't care what kind of hive they were in.

Evans said, "I plan to use asbestos siding for the top because it won't warp". He thinks perhaps aluminum might be the ideal answer for a hive but the price at the present time is prohibitive.

"Would you like to see inside the cement hive?" he asked me.

Mr. Evans got a bee veil for me then he took a smoker, bucket, and trowel over to the hive. "My bees are tame as house flies", he said proudly. "The Italian bees are the gentlest", he told me. The bees zinged in and out all around, it seemed to me, and gentle though he claimed they were, still I didn't see how they could miss flying into me but they didn't.

He puffed little clouds of smoke around the hive explaining, "The smoke calms 'em down", and he slipped a knife blade along the end of the frame and pried it out with the trowel. Evans gave an easy shake and the bees flew off the honey and out across the yard. "Bees are like people. They don't like to be pushed around", then he added, "Yes, you've got to be gentle with bees".

The sun tanned farmer cut out a square of honey and handed it to me. The thick amber colored honey had a delicate delicious flavor. He wiped his forefinger across the knife blade and tasted the honey critically. "Yes, that's nice gallberry honey. Nice flavor", he added, and a smile of satisfaction crossed his face.

Evans slipped the frame back into the hive slowly, "The bees are in a mighty healthy condition. You can tell by the number of bees", he said. He picked up the bee smoker and bucket and we walked over to the chairs in the shade of a willow tree and sat down.

"The bees work for me while I study", he said smiling slowly. "I've noticed the flowers around here and how they bloom."

Living alone in an isolated district, Evans has the time and opportunity to satisfy his desire for knowledge. He is never without a stack of books that he is studying. Botany, bees, stones, and stars, nothing escapes his interest.

"The spider plant, or electric light plant, as it's listed in some seed catalogs, has a pink blossom

and the bees are very fond of it", he pointed out one in the yard nearby. "Drops of nectar begin to appear between three and four in the afternoon and one drop appears every 15 minutes and the bees work until dark."

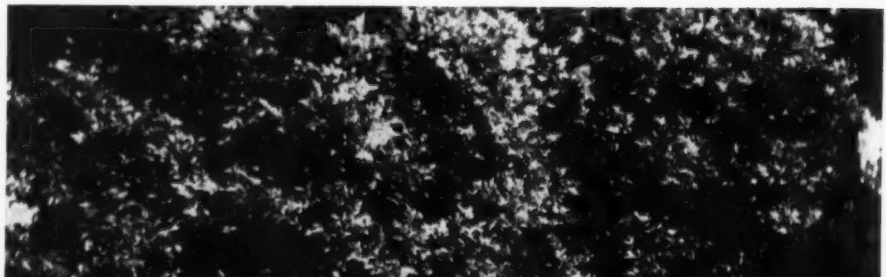
Other nectar-producing plants in this area are: huckleberry, which comes early and the bees use the nectar to raise their young; titi is plentiful but Evans seldom gets any because of weather conditions. The average is usually one good season out of five. The gallberries, hill and swamp, are the best nectar-producing plants in this region. The swamp gallberry starts blooming about March 25th and lasts 15 days. The blossoms start producing nectar about 12:00 and it flows freely until dark. This inquisitive hobbist has observed and recorded these habits of Nature and many others which are not related to bees and their product.

We moved over to a small lily pond planted with water hyacinths. The blue blossoms were covered with quivering bees. "I've been studying these plants", he told me, reaching over and snipping a branch off the cluster of hyacinths, cutting it across the stem. There in the sunlight we saw small drops of moisture appear. The rays of the sun sparkled in many colors and intensified the symmetrical patterns repeated in the small area of the stem. There was a stillness about the yard for a moment. Gradually, the hum of the bees became clear again and the words which Evans had spoken earlier came back to me, "Mother Nature is a master craftsman. People can learn a lot from her if they'll take the time to study".

Amber chunks of honey comb and gallberry honey fill the quart jars. This hand-packed chunk honey requires skill in packing but many years of experience in the hobby he enjoys has made a master packer of Mr. Evans. He disposes of his honey through quality grocery stores and long established mail order contacts.

Privet as a Honey Plant

By Franklin B. Wells, Upper Montclair, N. J.



Unclipped privet bushes grow into ornamental shrubbery.

There must be several hundreds, and perhaps even thousands, of plants in this country whose potentialities as honey producers, as well as for other purposes, are being neglected. The meager literature references to it place the privet, a genus **(Ligustrum)** of shrubs or trees of the order **Oleaceae,** in this category. Since the privet is used primarily as a box hedge, it is most often encountered in urban and suburban districts, but it is by no means unknown in rural areas. Its ready adaptability to environment makes it a potential source of large quantities of honey. In this country two species are well known. Of these, the European **(Ligustrum vulgare)** is fully hardy in the northern states and is probably the better known, while the so-called California privet **(Ligustrum ovalifolium)** is probably more common in the southern states. A few others of the 35 known species are also grown in this country but are much less generally known.

The privet is deciduous or evergreen, and in the natural state it is covered, during the spring, with large numbers of terminal flower panicles or clusters each of which may have as many as 40 of the small tubular, four-parted flowers open at a time. Bloom starts early between May 15 and 25 and ends between July 5 and 15, depending upon the season. The main blooming period in this locality is usually between May 25 and June 25. The name "privet" is supposed to be a corruption of the Latin word primus, meaning first. As the European variety is native to Mediterranean countries, this might indicate that the privet was the earliest quantity bloom known to the Romans. The flowers produce small green berries which remain on the plant during the winter, slowly turning dark or even black in color. They have an unpleasant taste but serve as food for many birds. Strangely enough, the set of these berries produced during a dry season is much less heavy than that produced during a wet one. Rain may, of course, tend to scatter the pollen, but I believe the reason is to be found in the size of the flower which is about one-eighth inch in diameter and one-quarter inch deep. This small size precludes the entrance of the bee, but the nectaries are easily reached with the tongue. During dry weather both pollen and tongue remain relatively dry so that the tendency of the pollen to adhere to the tongue is at a minimum but during wet weather when both pollen and tongue are damp, pollen will have a greater tendency to adhere to the tongue and thus be carried

about and distributed. Some pollen may also adhere to the feet and be distributed in that way during wet spells.

Unfortunately, the majority of privet is used for box hedges and is clipped. It is thus robbed of its flower bearing capacity as the flowers are terminal. However, where used as a shrub or as a true hedge, it blooms profusely and is a moderately reliable source of nectar. The color of the privet honey is just about equal to that of clover honey, being pale to lemon yellow. It possesses a very mild but distinct flavor, which, to my taste, makes it a preferable table article.

About 25 years ago a privet was planted in what is now my back yard. It is a good example of unclipped privet, being about 12 feet high. During this past year it bore about 3000 blooms with an average of 20 flowers open per bloom from May 26 to June 28. Observations of marked bees indicated that a bee visited about 30 flowers, not all on the same cluster, per trip and that each round trip took about 20 minutes. Further observations indicated that about 15 minutes were required by a flower to become fully attractive to a bee after a visitation. If this bush had been a mile away instead of less than 20 feet from the hives, the average round trip would have taken about 30 minutes. This means that such a bush could support about 4000 bees. Ten such bushes could keep a working force of 40,000 bees busy. As this is probably about the size of the field force of a strong colony, we might say that ten such bushes at one mile could keep a strong colony occupied.

Comb Honey from Privet

In 1943, a rather dry year, I operated one colony for comb honey where there were about 40 untrimmed privet bushes one-half mile away. In spite of heavy competition from other bees, this colony produced 75 lbs. of beautiful pale privet honey in white combs during the first three weeks in June. 1944 was wet, and I obtained 25 lbs. of privet comb honey from each of six colonies. 1945 was not only wet, but a honeydew year as well. While I obtained about 40 lbs. of comb honey from each of three colonies during privet bloom, I can only assume that about 25 lbs. was privet in each case. In 1946, I had moved to my present location. Casual observation has shown about 40 unclipped and 250 clipped privet within a mile. There may be two or three times these numbers actually present. About three miles away is an unclipped hedge of some 70 bushes and about five miles away is another of at least 250 bushes. I'd like to move my bees right under this latter one. The 1946 season was fair but late. Two colonies produced 50 lbs. each of comb honey which was largely privet with an admixture of darker honey. A third colony produced almost 25 lbs. in two weeks and then lost its queen. In 1947, three colonies gathered over 60 lbs. each of mixed comb honey during privet bloom. During 1948, three colonies produced 75 lbs. each of comb honey, but it was badly mixed and dark in color. It had a distinct buckwheat flavor which is still a mystery. There seems to be no buckwheat grown in this area, and, furthermore, it was far too early for buckwheat. Perhaps wild buckwheat blooms early and 1948 was a good year for it, or perhaps my bees found and robbed some stored honey, I don't know. I might add here that none of these mixtures detracted from the enjoyment of the honey but rather added to the anticipation of a good crop of privet.

The year 1949 brought that crop, but I almost missed it. During the winter, vandals had upset four of my colonies and had removed the covers from my other two and twisted them about on their bottom boards. By the time I found this condition some 24 hours later, the four upset colonies had died, but the other two, while having lost over a quart of bees each, were still very lively. At the end of the first week in May I started two package colonies and further mistreated my two wintered-over colonies by robbing each of a frame of brood to start two additional colonies from queenless packages. After these two had raised queens. I again robbed the originals of a frame of brood each to supply the new colonies with hatching bees while their queens got a start. This last was early in June and during privet bloom. In spite of all this mistreatment, my two wintered-over colonies produced 75 lbs. each of pure privet honey between May 28 and July 4. In line with other

(Continued on page 445)

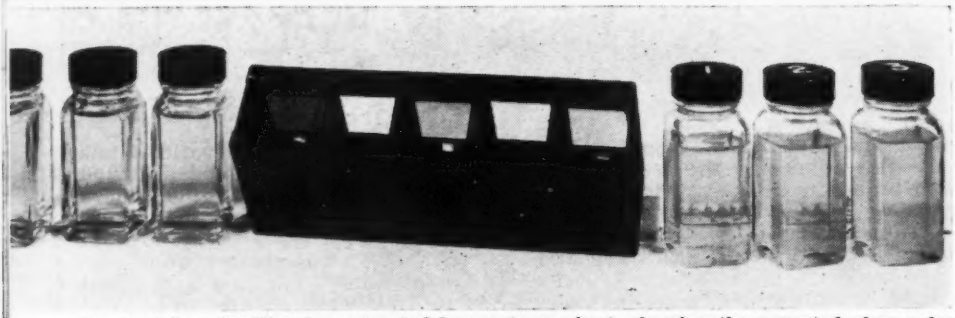


Fig. 1. Color classifier for extracted honey (rear view), showing the mounted glass color standards, the clear blanks, and the cloudy solutions.

Permanent Glass Color Standards for Extracted Honey*

B. A. Brice(1), A. Turner, Jr.(1), J. W. White, Jr.(1), F. L. Southerland(2), L. S. Fenn(2), and E. P. Bostwick(2) United States Department of Agriculture

Color has long been an important factor in the marketing of extracted honey. In recognition of the importance of this factor, the Department established a color classification for extracted honey in 1927(3) and made it a part of the United States Standards for Grades of Extracted Honey. These colors are designated as Water White, Extra White, White, Extra Light Amber, Light Amber, and Amber. The official instrument for determining color classification according to these standards has been the Pfund wedge comparator, which has been described in previous publications (3,5) and is commercially available. This instrument contains a wedge of amber glass, a wedge-shaped cell for holding a honey sample, and a millimeter scale with pointer to indicate wedge positions where a color match is obtained. The boundaries of the color ranges, corresponding to the above color standards are specified(4) in terms of scale readings on this instrument.

The Pfund wedge comparator is satisfactory as a laboratory instrument but is impractical for field use. There is a great need in the industry for a simpler and less expensive grading device. Attempts in this direction have been made in the past by use of cylindrical bottles or tubes as sample containers and colored solutions or colored glass as material standards but without success in this country. The recent successful development of a simple color comparator with permanent glass standards for maple sirup(6) suggested application of a similar system to extracted honey. Tests made during the past year confirmed its suitability.

The purpose of the present publication is to briefly describe the new comparators and permanent glass standards for color classification of extracted honey and to announce their commercial availability. It should be pointed out that although the United States Standards for Grades of Extracted Honey have recently been revised(7), the color requirements have not been changed but are now represented by permanent glass color standards for use in classifying the color of extracted honey. The permanent glass color standards are made a part of the revised United States Standards for Grades of Extracted Honey which became effective April 16, 1951. The Pfund wedge comparator may be used henceforth only for approximate color classification(7).

Before glass color standards could be developed, it was obviously necessary to decide on a suitable standard thickness or layer depth of honey and a suitable sample container, for use in grading for color. Tests made with clarified honeys, selected and blended to correspond to the standard scale readings of the Pfund wedge comparator, indicated that 2-ounce square bottles having an internal thickness of 1.24 inch (31.5 mm.) met the requirements for satisfactory containers. The advantages of these bottles are: (1) they are inexpensive and available commercially; (2) the relatively large thickness of layer facilitates precise grading, since honeys of standard color are widely spaced on a color scale

*Report of a study in which certain phases were carried on under the Research and Marketing Act of 1946. Published simultaneously as AIC-307, Est. Reg. Res. Lab.

Fig. 2. Color classifiers for extracted honey (front view), showing the blanks and cloudy suspensions in place behind the mounted color standards, and two samples of extracted honey to be classified.

when viewed in this thickness; and (3) the square shape provides a field of view of uniform thickness and uniform color, a feature which would not be possible with cylindrical containers. These bottles should also be suitable and convienient for use as sample bottles in connection with the marketing of honey.

Selection of suitable colored glasses to be used as standards was done by means of spectrophotometric measurements on filtered honeys, solutions of caramel in glycerin, and commercially available colored glasses. Phillips(8) has shown that the spectral transmittance of honey is subject to variation depending on its source and turbidity. Our preliminary tests, however, showed that solutions of caramel in glycerin were good spectral matches and good color matches with typical filtered honeys and that such solutions were more convienient than honeys as temporary secondary standards to aid in the development of glass standards. Caramel-glycerin solutions were, therefore, prepared which gave standard scale readings on the Pfund wedge comparator, and their spectral properties measured in 31.5 mm. thickness. Pfund scale readings and absorbance at only one wave-length are shown in Table I for these solutions. Commercial colored glasses were then found which, when ground and polished to our thickness specifications, duplicated closely both the visual colors and the spectral properties of the caramel-glycerin solutions (and hence typical honeys) in 31.5 mm. thickness. A more complete description of the glass color standards with detailed colorimetric specifications will be published elsewhere. The Department has arranged for the purchase of a large supply of the selected colored glasses so that an adequate supply for the estimated needs of the industry is assured. All individual glasses are tested at the Eastern Regional Research Laboratory to assure close standardization of duplicate glasses.

The new color comparators (Figs. 1 and 2) containing the permanent glass color standards are all-metal boxes having dimensions approximately 8 by 2 by 3 inches, divided by thin partitions into five square compartments, each of which has two windows approximately 1.2 inch square. The three lighter glass standards (Water White, Extra White, and White) are mounted in one of the comparator boxes on a shelf against the front windows in compartments 1, 3 and 5. The three darker standards (Extra Light Amber, Light Amber, and Amber) are mounted in a similar manner in a second comparator box. Three square sample bottles filled with distilled water (referred to as "blanks") are placed in the compartments behind the glass standards in the comparator being used for grading. Empty square bottles are provided for honey samples. A bottle containing honey to be classified is placed in the appropriate comparator in either compartment 2 or 4 so that it will be between adjacent standards. To assist in the classification of honeys which are appreciably turbid, three square bottles containing suspensions of bentonite in distilled water are provided. These are referred to as "Cloudy 1", "Cloudy 2", and "Cloudy 3", and are used interchangeably with any one of the clear blanks to reduce the brightness of a glass standard to a level near that of the honey to be classified.

The following procedure is used in classifying extracted honey with these comparators.

(1) The clear blanks or the cloudy suspensions are placed in back of the glass standards in compartments 1, 3 and 5 of one or both of the comparators.

(2) The honey to be classified, which must be free of granulation, is poured into a clean dry bottle. The

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bottle is then placed in compartment 2 or 4 of either comparator box.

(3) The comparator is held at a convienient distance from the eye and viewed by diffused light (e.g., by north sky, overcast sky, or diffused artificial light source provided by a tungsten lamp or a white or daylight fluorescent lamp). The color classification of the honey is then determined by comparison of the sample with the standards. Switching the sample from compartment 2 to 4, or vice versa, interchanging the clear blanks and the appropriate cloudy suspension, and in some cases shifting to the second comparator or using both comparators, may be necessary.

If a sample is equal to the Water White standard in hue, or not as red (that is, yellower), the color is classified as Water White; if perceptibly redder than the Water White standard in hue, but not redder than the Extra White standard, the color is classified as Extra White; and so on. If redder in hue than the Amber standard, the color is classified as Dark Amber. It is emphasized that hue (amber quality or redness) is the attribute of color to be considered in this classification.

Most honeys are appreciably cloudy because of the presence of air bubbles and fine suspended matter. In such cases the brightness of a sample is lowered and its color classification may be difficult to determine, particularly if its hue is near that of one of the color standards. In such cases color classifications will be more easily determined if the clear blank is replaced by one of the cloudy suspensions. These suspensions are intended **only** as aids in the classification for color and **not** intended as standards for "clarity", which is one of the factors scored in ascertaining the U. S. Grade of honey.(7) They may in some cases, however, serve as aids in assessing clarity.

The honey color comparators, complete with permanent glass color standards, clear blanks, cloudy suspensions, and empty sample bottles are now commercially available. Information on where they may be obtained, and additional details concerning them, may be obtained from the Fruit and Vegetable Branch, Production and Marketing Administration, U. S. Department of Agriculture, Washington 25, D. C.; or from the Eastern Regional Research Laboratory, Philadelphia 18, Pennsylvania.

U.S.D.A. photos by M. C. Audsley

*. Report of a study in which certain phases were carried on under the Research and Marketing Act of 1946. Published simultaneously as AIC-307, Eastern Regional Research Laboratory.

1. Eastern Regional Research Laboratory, U. S. Department of Agriculture, Philadelphia 18, Pa.
2. Fruit and Vegetable Branch, Production and Marketing Administration, U. S. Department of Agriculture. Washington 25, D. C.
3. U. S. Dept. Agric. Circular No. 24 (Dec. 1927). United States Grades, Color Standards, and Packing Requirements for Honey Recommended by the United States Department of Agriculture.
4. U. S. Production and Marketing Administration. United States Standards for Grades of Extracted Honey. Effective March 15, 1943. Issued Jan. 30, 1943; Reissued Dec. 15, 1945. 3 p. Processed.
5. E. L. Sechrist, U. S. Dept. Agric., Dept. Circular 364 (October 1925). The Color Grading of Honey.
6. B. A. Brice, A. Turner, Jr., F. L. Southerland, and E. P. Bostwick, Bur. Agric. and Indus. Chem., U. S. Dept. Agric., AIC-260 (Feb. 1950) (Eastern Reg. Res. Lab.); The Canner, 110 (6) 10-11. (Feb. 11, 1950). Permanent Glass Color Standards for Maple Sirup.
7. U. S. Production and Marketing Administration. United States Standards for Grades of Extracted Honey (Effective April 16, 1951) 12 p. Processed.
8. E. F. Phillips, J. Agricultural Research, 45, 757-770 (1932). Definitions of Honey Color Grades.

Table I. The U.S.D.A. color standards, with scale readings on the Pfund wedge comparator; spectral absorbance of caramel-glycerin solutions corresponding to standard scale readings.

U.S.D.A. Color Standards	Pfund Wedge Scale, mm.	Caramel-glycerin solutions, Absorbance* at 560 mu.	
		10 mm.	31.5 mm.
Water White	8	0.0300 **	0.0945
Extra White	17	.0600 **	.189
White	34	.119 **	.378
Extra Light Amber	50	.189	.595
Light Amber	85	.441	1.389 **
Amber	114	.979	3.008 **

* Absorbance (optical density) equals log-10 (100/per cent transmittance) measured versus an equal thickness of glycerin.
** Calculated values.

Second Glances

C. M. Isaacson

The varied climatic regions into which British Columbia can be divided render it not only impossible to prescribe a one-for-all beekeeping procedure (which of course is true to a greater or less degree for most places) but makes for a pleasing variety of honey. That so-called "wild honey" which many beekeepers know, is Nature's blend in her own processing "plant". As Mr. Turnbull says, one taste lingers. I remember a year when I retailed a quantity of honey with a considerable proportion gathered from wild cherries. It was dark—even had a reddish tinge, and I offered it along with a very white clover honey by the "taste method". On the next trip, a large majority asked for some more of that "good fruit honey". It had taste appeal (page 329).

Some of the "whys" behind scientific breeding procedure are given in the Roberts-Mackensen article (page 335). It is not only interesting reading but gives some understanding of the problems involved. It is well to keep in mind also that methods successful in other cases were not so in honey bees, because of complex hereditary factors and lack of understanding in some cases. This series of articles should be well worth reading.

Truck movement of bees over long distances has become so common now that most of us have no realization of the "growing pains" connected with this phase of our industry. Movement by horse transportation—or even by train—was limited and full of trials. Now North to South trips spring and fall have become a regular procedure for quite a number—with little or no loss of bees (page 338).

Double brood chamber comb honey production probably does not produce the very largest yields, but considering labor involved, it is worth a trial by anyone but a specialist in this line. As Mr. Raynes mentions, the double brood chamber lessens examinations; natural queen supersedure usually takes place each season; stores do not as a rule get low; and wintering is better. It is a promising procedure (page 340).

Low moisture content is more and more demanded for high quality honey of late, so the new instrument used to determine it speedily and with a high degree of accuracy is surely of definite value (page 342). Its cost is rather high for most individual beekeepers, but brokers and cooperatives could make good use of it, especially since it will tend to further standardize computations.

The quick carmelization property of honey does make for an outstandingly golden brown crust on breads in which it is used (page 344). And that basic recipe Mrs. Nielsen gives should be a time saver to many (and of course produce **good** eats).

There may be a real can shortage this fall if a big crop materializes, so the Anti-rust Oil told of by Mr. Babcock may be of even more value than he believes. We may need to save every can possible (page 346).

Stacking supers in outyards is a regular procedure with many beekeepers here (page 351). As Editor Deyell says, one can feel especially satisfied with so doing when roads are bad and supers are needed. We also stack up a certain amount of honey for spring feeding. Supers are on a platform about ten high (these supers are six-inch depth), the stack secured with criss-cross lath, and shingle covers **nailed** on top of each stack. The honey pile must be built with care to make it absolutely bee tight or it will be robbed out—and bee tight almost means mosquito tight, as many have found out! It is a mighty handy thing to have, tho, when one must walk into a yard and finds colonies short of stores.

More bad beekeepers than bad seasons, says the item from Scotland (page 364). If we are to be honest we must, most of us, admit that we fall into that first category at times. I know that most of my "bad seasons" could have been better ones if I had been a better beekeeper. Keep this in mind.

The life of Frank Pellett is worth many and many a "second glance". He was a remarkable and versatile man and we all owe much to his years of love and service. May there be many more such, and his memory be green long.

These Are Honeys

By Mrs. Benj. Nielsen

Aurora, Nebraska

Honey jubilees and honey iced tea for heat searing days.—Photo Courtesy Kellog Co.

Frosty grapes, minted honey-sweetened iced tea, yummy honey jubilees—and who cares about the heat! It's good nectar-gathering weather, isn't it? And with honey fruit salad dressing reposing in the refrigerator, an abundance of fresh fruits over which to drizzle it, honey dough freshly punched down this morning (June Gleanings) we can have a deluxe meal with very little effort. And if you are extra hungry, perhaps you will want to top off the meal with a big scoop of vanilla ice cream, with a honey sauce—simply a generous spoonful of honey over each scoop—then sprinkled with salted nuts and maybe a maraschino cherry for a dash of color.

Honey Jubilees

One-half cup shortening, ½ cup sugar, ½ cup honey, 2 eggs, separated, ½ teaspoon vanilla, 1¾ cup sifted flour, ¼ teaspoon soda, ¼ teaspoon salt, 1½ teaspoons cream of tartar, 1⅓ cups oven-popped rice cereal and ¼ cup jelly.

Cream the shortening, add sugar and honey gradually, then the well-beaten egg yolks and vanilla; beat well. Stir in flour, soda, and salt sifted together. Fold in the stiffly beaten egg whites to which cream of tartar has been added. Shape dough into small balls about 1 inch in diameter. Roll in the slightly crushed cereal. Place on greased baking sheets, make an indentation in the middle of each ball with the thumb and fill with jelly. Bake in a moderate oven, 350 degrees F., for about 20 minutes. Yield: 28 cookies (2½ inches in diameter).

Honey Fruit Salad Dressing

One teaspoon dry mustard, 1 teaspoon paprika, ¼ teaspoon salt, 1 teaspoon celery seed, ½ cup sugar, ½ cup honey, 5 tablespoons vinegar, 1 tablespoon lemon juice, 1 teaspoon grated onion, and 1 cup salad oil.

Mix dry ingredients thoroughly; add honey, vinegar, lemon juice, and grated onion. Add oil very slowly, beating constantly with rotary or electric beater. Serve with fruit salads. Makes 1 pint.

Honey Glazed Carrots

Six to 8 large garden-fresh carrots, 4 tablespoons butter, 4 tablespoons honey, and about ⅛ teaspoon salt.

Wash carrots but do not scrape or peel. Cook in boiling water until tender. Drain and while they are drying, combine butter, honey, and salt in a heavy pan. Heat to simmer then add carrots, continue to simmer and turn carrots carefully to complete glaze.

Dr. Jacob Schramm and Fred W. Schwoebel making the first planting for the Langstroth Memorial Garden at Morris Arboretum.

Announcing the Planting of a Garden of Honey and Pollen Plants at the Morris Arboretum of the University of Pennsylvania, in Philadelphia, as a Memorial to Lorenzo L. Langstroth.

Initial planting for the above was made on April 7, 1951 when Dr. Jacob Schramm, Director of the Morris Arboretum and the writer set out three Ever Flowering Locust trees. The section set aside is the newer portion of the Arboretum and is to be developed in trees and shrubs which are of interest to the bees. Something over 50 plantings have been made at this writing.

It is planned to have dedication services in the fall at about the date of the 100th Anniversary of Langstroth's invention of the modern bee hive, and to have a memorial bench ready at that time. The bench is to be made of "Shipmast" Locust, a variety of black locust growing on Long Island, the wood of which is of exceptional durability. Two such benches are now in the Arboretum, one of which is a memorial to the founders of the Arboretum. They are entirely in keeping with the surroundings and give ample space for inscriptions.

Because of the fact that Langstroth was a native Philadelphian, and that at the time he invented his movable-frame hive in 1851 kept his bees on land now occupied by the University of Pennsylvania, it is thought particularly fitting to have this memorial to him here and to have the dedication timed to mark the centennial of his invention.

Dr. Jacob Schramm, Director of the Morris Arboretum, deserves the thanks of all beekeepers in initiating and forwarding this project.

An informal committee of local beekeepers and other interested persons is acting with the writer in cooperation with the Arboretum staff. Members of this committee are Elmer F. Reustle, former President of the Pennsylvania Beekeepers' Association, Harry Pye, Secretary of the Philadelphia Beekeepers' Association, Edwin Glenn, former Secretary of the Bucks County Association together with Charles Hallowell, Philadelphia County Agricultural Agent, and W. W. Clark, Pennsylvania State College Extension Specialist in Beekeeping.

The Frontier's article on Langstroth, was written for the purpose of stimulating interest in Langstroth locally, particularly among members of the Philadelphia Academy of Natural Sciences, which publishes this magazine. Langstroth was a member of this institution until his death in 1895.—Fred W. Schwoebel, Ledger Bldg., 6th and Chestnut Sts., Philadelphia, Pa.

XUM

Editorials

Be Sure to Read Institute News Notes These notes in Gleanings each month are always worthwhile. This month they contain excellent information on how to become familiar with the rudiments of good honey selling techniques. Please read these News Notes, then reread them—carefully.

The American Honey Institute is rendering a superb service to our industry in creating more consumer interest in honey. But the Institute cannot and should not be expected to do the entire job of finding a market for all of the honey produced. Beekeepers must help themselves and they can do so by availing themselves of the helps—printed matter and suggestions—offered by the Institute. It has been said that the American Honey Institute is one of the beekeepers' best friends. Let's continue to give the Institute our moral and financial support.

Have the Platter Right Side Up Cool, unseasonable weather has held back nectar secretion in this section of Ohio. Clovers appear to be ready to yield whenever the weather is suitable for nectar secretion.

Ten years ago we had a very cold, rainy June. The major honey flow in this area did not begin until July 1, and when it did begin we actually secured a good crop of honey—around 100 lbs. average per colony.

This year beekeepers in this area are still waiting to see what will happen. In any event, supers should be on the hives ready for any honey flow that may materialize.

Ladino Clover A considerable amount of this clover is now being grown by farmers over the country and it is proving quite satisfactory. It seems to be more drouth-resistant than alsike or Dutch white clover. It has a different root system. It blooms later in the season.

We have been hoping the bees would store surplus honey from Ladino clover. There have been a number of reports—some favorable, others, not so favorable. Reports from California have not been favorable.

In South Carolina, where the writer visited early this season, a considerable amount of Ladino is grown. Most beekeepers said they could see no material gain in hives from Ladino, while others said that if Ladino is grown on soil containing lime, the bees store some surplus.

Here in Ohio we have had some favorable reports. Last year in some sections of Ohio, there was a honey flow from Ladino in early August. This flow came at a time when other clovers were not yielding. We are therefore hoping that Ladino clover, after it has become acclimated, may eventually become a source of surplus honey.

Real Selling Effort Needed During the first World War, entering a large photographic material store we inquired for a certain product. The clerk coolly said, "Yes, we have it but not for you". As a publisher we had a priority rating entitling us to that material but, provoked at the answer, we left the store, ordered the material from the factory, and got it.

Standing in line at a hotel desk, the man just ahead of us told the hotel clerk that a month before he had written, reserving four double rooms for a group of men who were to be in conference that day. The clerk said they had not made the reservations because they were crowded. The man, evidently indignant but keeping his temper, said, "How does that come? I have been stopping at this hotel for years. Letters have been sent these men, asking them to meet me here. If you could not reserve the rooms why didn't you notify me so that I could make other arrangements?"

With a shrug of the shoulders, the clerk replied, "I have told you that we had no rooms; what are you going to do about it?"

When the demand is greater than the supply, many, not big enough to realize that another day may be coming, not only lose all evidence of courtesy but become rude and overbearing.

When so much honey was being sold at unheard of high prices during the black market days, producers of honey, while not guilty of the dis-

courtesies in the two instances mentioned above, often forgot that another day would follow and ceased all effort to sell. Why worry when buyers paid cash in advance for honey still on the hive? Why advertise the food value of honey when there was not enough to satisfy the average demand? Why contribute to the American Honey Institute when the Institute could not put more honey into the combs?

Wise store and hotel managers, looking into the future, required courtesy on the part of all clerks, insisted on expressions of sincere regret when a patron could not be accommodated, and thus tried to build up good will for a time when the supply would be more than the demand.

For years, Mr. Deyell has been saying to honey producers "to sell you must tell". Many conditions are sadly out of balance today and they may not change for some time to come. Producers who are making an all-out effort to sell are being rewarded. Others are idly sitting in the market place, waiting for customers to come.

Competition is forcing merchandisers to make a supreme effort. Motor court and motel installations are compelling hotel clerks to be more courteous. The competition of inferior but low-priced syrups ought to compel a supreme selling effort on the part of cooperative managers and honey bottlers, large and small. And the roadside seller who is still disposing of a respectable part of the honey crop needs larger, more attractive signs, located farther away in order to give the speeding motorist time to stop. They need more attractive stands. Remember that comb honey is the best advertisement known for all honey. A clean, neat display attracts the housewife who ultimately buys most of the honey for table use. Service with a smile, plus a good selling message during and after a sale has been made, brings the customer back again and again.

American Business, published by Dartnell Publications, Inc., 4660 Ravenswood Ave., Chicago, says editorially in the May number:

Put Some Kick in Your Selling if you want to sustain business this coming summer. High prices, the deadly routine, uninterested, lackadaisical way in which big-ticket merchandise is sold today takes all the thrill out of owning almost any piece of merchandise. We had a television receiver demonstrated to us with about the same enthusiasm as we would expect from a salesman selling a package of aspirin or a garden hose. We bought a new spring suit and the salesman did not even tell us it made us look younger, slimmer, or handsomer." . . . . . "The plain truth is that a fairly high percentage of all salesmen in America today never experienced real sales resistance; plainly, they do not know how to sell except in flush times. This lack of competitive sales experience runs all through every sector of distribution."

Importance of Honey Bees for Pollinating Red Clover

Experimental tests have shown many times that when pollinating insects are excluded from red clover blossoms that practically no seed sets. Probably red clover is about the most self-sterile among the legumes. A simple but most convincing demonstration to farmers of the need of pollinating insects is to cage red clover blossoming plants and prevent pollinating insects visiting them.

Surveys on red clover bloom in agricultural areas of intensive cultivation show that honey bees may provide from 70-98 percent of the insect pollination. Wild pollinating insects are too few in numbers and perform a small part of the required job of pollination. Thus the only present economical solution of providing sufficient numbers of flower visiting insects in fields for seed production is the placement of honey bees in such fields.

Large populated colonies of honey bees, which are managed to stimulate maximum nectar and pollen gathering responses, are highly important to attain the potential coverage of blossoms which such colonies are capable of delivering.

The number of honey bees per unit area to insure coverage of bloom is an important aspect for consideration. A number of factors might influence the number of bees per unit area such as number of blossoming heads, duration of the bloom, weather, etc. In general for a normal stand of red clover if honey bees are working the bloom in sufficient number so there is an average of one honey bee per square yard it could provide coverage for exceptional high seed yields —perhaps as high as twelve bushels of seed per acre.—W. E. Dunham, Department Zoology and Entomology, Ohio State University, Columbus, Ohio.

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From North, East, West, and South

SOUTHERN CALIFORNIA, June 2

Weather: The month of May was a delightful month as far as weather goes. There was a little rain — half an inch or more — about the middle of the month but there was not enough to do any appreciable good. Unfortunately the rain, together with cool weather kept the bees from gathering orange honey for a few days.

Condition of Bees: Bees are in A-1 condition right now at the close of the orange flow.

Condition of Plants: The situation so far as the sages and buckwheat are concerned is bad. The lack of rain has caused these shrubs to be very dry and there will probably be no honey from those plants. All of the grasses are past.

On May 22nd, in looking over some of the orange groves, we observed that there were very few blossoms left among the ripe fruit ready for the market. We often think that the orange trees laden with golden fruit and white blossoms is one of the greatest attractions California has to offer the tourist of moderate means. Also the blossoms are a great attraction to the beekeepers from near and far.

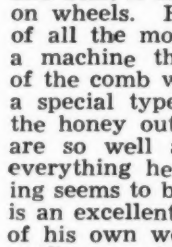
Orange Honey Crop: Beekeepers are busy taking off the orange honey. From what we can learn the crop will be below that of last year's average. From 30 to 50 pounds per colony might be a good guess at this time.

Miscellaneous: Thousands of colonies of bees are being made ready or have been moved north to the alfalfa fields. Later many of them will be moved to the cotton fields. The value of the bee for pollination is of such recent knowledge that many of the alfalfa and cotton growers are just now beginning to learn of the value of the busy little bee as a helper in the production of more and more per acre.

To those beekeepers who move every year it is just one of those things that go with the business. To the fellow who never moved before it is a big chore. But there are thousands of colonies on locations where they formerly always got at least enough honey to live on. Not so this year. It seems to be a case of move to better pastures, feed them, or else let them starve.

We have seen many extracting outfits in our time—both stationary and portable. But it was left for Mr. Bill Miles of San Bernardino to build what might be called the latest thing in a portable extracting outfit. He bought a used school bus and built it into an extracting house on wheels. His equipment consists of all the most modern — such as a machine that uncaps both sides of the comb with one motion. Also a special type of press for getting the honey out of cappings. Things are so well arranged that he has everything he needs and yet nothing seems to be crowded. Mr. Miles is an excellent mechanic and did all of his own work. The cost of this outfit was about $2000. Mr. Miles takes his outfit to San Bernardino where he extracts his orange honey then goes to the Imperial Valley where he has a large number of colonies on the alfalfa. It was a most interesting experience seeing this very modern extracting outfit.—L. L. Andrews, Corona, California.

NORTHERN CALIFORNIA, June 1



Weather: Rain fell rather generally over the northern part of California during the first part of the month of May, adding somewhat to the top moisture in the soil and improving grass and grain conditions. Rather heavy snows fell in the higher mountains. Total rainfall for the season is about one and one half inches below normal with little chance for additional rains before the heat of summer. This is going to be a short year and a dry one, with fire hazards increasing with the dry summer months. The foothills and pastures are turn-

ing brown earlier than usual, making early irrigation of pastures essential in many areas. Native plants will suffer as a consequence of the shortage of soil moisture.

Colony Conditions: Beekeepers have fed more sugar in northern California than is usually necessary and reports of colonies dead of starvation are not uncommon. Colonies in favored areas have built up normally and some swarms have issued from those not properly managed for swarm control. Several thousand divisions have been made from nuclei to make sufficient colonies for pollination purposes, both in California and in Oregon. Divisions made early in April, are now filling the second story when they were placed in favorable locations. The divisions have more than made up for loss from starvation and other causes.

Pesticides: Heavy losses of colony strength have been reported for colonies in almond and apricot orchards. These losses appear to be due to applications of arsenicals for the control of the peach twig borer. Irregular blooming of different varieties create blossoms over a long period so that orchards are sprayed while many trees are still in bloom instead of after the petals have fallen, as recommended. Chemical weed control, leveling of land for cultivation and the elimination of fences and natural drainage channels are tending to reduce pollen and nectar sources for bees. Increased seed areas have not made up for this loss as in such areas the placing of three to six colonies per acre during the blooming period seldom allows enough nectar and pollen for even the normal development of colony populations.

Pollination Practices: Reports from beekeepers indicate that many growers are waiting to the last moment to secure colonies for pollination purposes, some on the assumption that the price for such services will be cut by anxious beekeepers. Some rentals are again too low for the best interest of the beekeeper or of the seed grower but history indicates that it is necessary for some to learn the hard way. The most commonly used contract calls for a payment of from $3.00 to $3.50 per colony on delivery of the bees, plus one cent per pound of seed per colony for each pound of cleaned seed above a 350-pound average. This is for alfalfa. Other contracts call for cash payments of from $2.50 to $7.00 per colony, or for the equivalent of 60 pounds of surplus honey per colony.

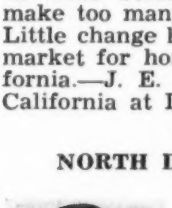
Emphasis should be placed on the fact that the number of colonies of bees in a seed field should be reduced to one per acre during the last three or four weeks before the seed is harvested, in order to give the bees a chance to fill up on honey and pollen for the winter season. It takes legume seed from three to four weeks, or longer, to mature after the blossoms are fertilized and a surplus of bees in a seed field is of no value to the seed grower during this final period before harvest. This removal of bees from the seed fields will make it possible for the same colonies to be used on dry land alfalfa and on irrigated alfalfa in the same season. It will also enable the beekeeper to move his colonies from Ladino and red clover fields to better locations and possibly reduce some of the causes of weakened colonies in the spring due to a shortage of pollen.

Cost of Operating Bees for Pollination: Some individuals — too many, in fact — seem to think that it does not cost much to keep bees; that the colonies do all of the work and the beekeeper takes the profits. Every beekeeper should keep sufficient records during the year to indicate the costs of labor, transportation, depreciation and replacements, loss from poisoning and moving, interest on investment, and expenses away from home, as well as for all income, in order to determine what it costs per colony to operate colonies for package bees, queens, honey, or for pollination services. A beekeeper who engages actively in the business as his sole source of income will have to gross between $15.00 and $20.00 per colony, depending on his expenses, in order to make a modest living.

Marketing: We had expected that the Honey Marketing Order in California would have had its first hearing before June 1 but the pressure of work on fresh fruits has forced a delay until, possibly, around the middle of June. It takes time to perfect any major change in the support of marketing any agricul-

tural product but it is better to take sufficient time to have everything in order before it is tried than to make too many changes afterwards. Little change has taken place in the market for honey in northern California.—J. E. Eckert, University of California at Davis.

NORTH DAKOTA, June 4



Weather: Spring opened up on schedule and indications at the outset seemed favorable to another good year for agriculture. Good to bumper crops have been the rule in this area for the past ten years in a row. However, as the spring advanced a serious lack of rain began to endanger the crops. Within the past week, however, the situation has been changed by a good to heavy rainfall throughout most of the state. An interesting sidelight on this timely rainfall is that the commercial rainmakers are claiming credit for this phenomenon of nature, even though the U. S. Weather Bureau had predicted that rainfall would occur. According to newspaper accounts the commercial rainmakers operated in the southwestern part of North Dakota and adjoining portion of South Dakota by "seeding" the clouds with silver iodine particles.

The rain has greatly improved the outlook and prospects are for an ample amount of bee pasture. Whatever lack of sweet clover there will be because of weevil damage will be largely offset by a growing acreage of alfalfa for seed. Alfalfa seed growers appear to be generally aware of the value of bees for legume seed production but are unable to secure anywhere near the number of hives of bees for their needs.

The sweet clover weevil continues to be a serious problem here. Indications are that this pest is more damaging than for several years past. Most fields recently seeded are being seriously damaged. The new seedings which adjoin fields of second year growth receive the heaviest damage. Many farmers have reported that fields which are seeded late in June escape damage provided there is adequate soil moisture.

Package bees; Reports would indicate that package bees have varied considerably in performance this season. The main trouble seems to have been due to failure or loss of their queens after the packages are established. In one instance coming under my observation this season, one lot of packages developed in very satisfactory manner with no loss of queens while another shipment coming to the same beekeeper but from a different source, showed 40 percent loss or failure of its queens. Both lots received identical care following their arrival. Such loss as this is something which beekeepers can ill afford.—J. A. Munro, Fargo, N. Dakota.

NEBRASKA, June 5

Weather: It has been said, and with more than a little justification, "If you don't like the weather in Nebraska, wait 30 minutes, and there will be something different." We surely do have sudden drastic changes and lots of variety. From breathless 90 degree weather in May to snow the first of June, high winds, hail, torrential rains, and now floods. On the whole, the spring has been very backward, cold, cloudy, and windy with moisture far above normal, in some instances as much as 12 inches.

Condition of Bees: Winter loss ran about normal. Bees came through in fair condition and an unusually heavy fruit bloom gave them plenty to work on. A streak of unusually cool weather following fruit bloom has been hard on bees, and some reports of starvation have been noted. Usually bees go from fruit bloom to yellow sweet clover, but the bloom has been slower to appear this year.

Crop Prospects: Despite the backward spring weather, prospects for a good crop have never been better. Clovers are in excellent condition and we have had copious moisture.

Miscellaneous: Increasing interest is shown in bee pollination services. In some localities beekeepers accept a portion of the seed as payment.

This, however, has its drawbacks if bees are placed on alfalfa. A small amount of honey is derived from alfalfa so the beekeeper has to decide whether to concentrate on producing a honey crop, or hiring bees for seed production. On a monetary basis some localities pay a rental of $7.00 per colony with 1000 square inches of brood, and $5.00 rent for 600 to 1000 inches.

Just in case you did not know it, efforts of the bees are needed in war production. Their beeswax is needed for coating war munitions and also is used by airplane manufacturers. So give the busy winged creatures a good old pep talk and let's produce lots of honey and beeswax.—Benj. Nielsen, Aurora, Nebr.

MICHIGAN, June 1

I have just come in from the apiary and find that things have been really booming during the last two weeks. There has been good moisture in the soil so that a predominance of bright, warm weather lately has brought red clover knee high. White Dutch and alsike have been blooming for several days. Plants look very lush and prosperous just at present. The old sages used to say that rain in May is important in bringing on a good honey crop. So far there has been good rain, sunshine, and heat. Maybe this will be the year of the big crop. Michigan beekeepers are due for a big crop.

A person cannot mention honey plants without thinking of Frank Pellett. His recent passing is a great loss to the industry. His life to me was an object lesson in how much good a man may do if he works consistently and persistently and particularly with enthusiasm in a good cause. Mr. Pellett accepted the fact that plants were fundamental to successful beekeeping but he did not accept the fairly common belief that the industry must accept only plants native to the area or those established for other purposes.

He held to his views and has proven that beekeepers can lead the way in testing and introducing to agriculture plants of value to bees. There is no doubt that he has promoted a line of thought in this respect that must be continued for the benefit of the industry. Most of the many honey plant test gardens of the United States and Canada were inspired directly or indirectly by Mr. Pellett. The old master is gone but I think that the many honey plant test gardens operated privately or by beekeeping institutions indicate that his work will be carried on and his influence survive.

Great credit fittingly goes to the pioneers, the men and women who break new sod. Only a few of us are fortunate or gifted enough, like Langstroth, to make a new tool or develop a new approach that will have a marked influence on future generations. Because of his contributions in connection with honey and pollen plants, Frank Pellett would no doubt classify as a sod buster to the beekeeping fraternity.

Summer Fairs: This year beekeeping will be the featured agricultural industry at the Michigan State Fair in Detroit. The usual amount of space will be allocated for beekeepers' displays and competitive honey. Right across an aisle about the same space will be allowed for special displays which are to show the importance of the beekeeping industry in the production of honey and beeswax and particularly in the pollination of many crops.

This is a great opportunity and it is to be hoped that Michigan beekeepers can take full advantage of it. What is needed is a first class artist and display technician who would work with the committee for a reasonable price. If the job is well done the publicity and advertising resulting from such a display is of great value in the never ending job of building up and maintaining a honey consciousness on the part of the general public.

If honey isn't on the prize list at your local fair, make a point immediately of interesting your local association or neighboring beekeepers in getting it on for the future. Showing honey at the Fairs can be fun. You will learn and the consuming public will learn more about your favorite food. Don't forget to have a class for finely granulated honey. This will contribute towards consumer education as to the varied forms and wider uses of hon-

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ey. Competition for first prize is good but don't be too concerned if the judge doesn't tie the ribbon on your honey even if you know that it is the best in the country. If you are asked to judge and are afraid of the job I can send you a score card that may help. The points may be changed to suit your ideas or local conditions but a detailed score card is a big help for accuracy.—E. C. Martin, Department of Entomology, Michigan State College, East Lansing, Michigan.

TEXAS, June 4

Weather: While temperatures over Texas during most of May continued below normal, the latter part of the month brought increasing high daily temperatures and warm nights favorable for plant growth. Abundant rain fell over most sections, however, dry weather still prevails over both east and west Texas. Drying winds helped dissipate soil moisture and a general rainfall is sorely needed.

Bees, Plants, and Honey Crop: In east Texas where conditions during April were highly favorable for a normal honey crop, dry weather shortened the bloom of holly, rattan, and white clover, with a dearth of nectar at this time. In a few favored localities some surplus was obtained from vetch. Locally there is but a scant flow from horsemint, usually a dominant source at this time. There is still some prospect for a flow of pepper vine, with the best prospects for cotton in river valleys with the bloom expected in about 30 days. Throughout its range the spring bloom of mesquite was the heaviest in some years. Reports of a good crop of mesquite honey extend across the State from south to north Texas. Throughout most of the blackland area there is a large acreage of Madrid clover completing an excellent bloom. Considerable surplus was stored from this source. While the quality of Madrid clover may be preferred to that of Hubam it does not yield nectar as heavily. There is considerable reduction in acreage grown to Hubam as a result of a large carry-over of seed from last year and a consequent reduction in price. Too, farmers prefer Madrid for its longer grazing period. Vetch is in excellent condition in northeast Texas. The honey flow is the heaviest in recent years. With the heaviest bee concentration in Kaufman County, placed at least one hive of bees per acre, there appears to be no overstocking so far as honey production is concerned. In the western portion of the vetch area, the crop is rather spotted as a result of dry weather and many plantings were abandoned. In the high plains where prolonged drought reduced the yield of small grain to a record low, recent rainfall brought on extensive planting of cotton. For the State as a whole prospects are for a smaller-than-average honey crop because of the decreased acreage of Hubam clover.

Market: Considerable new honey is moving from producers to packers. While the price support program allows producers a slight price increase, this advance is not reflected in the retail market where prices are practically the same as last year. Beekeepers should acquaint themselves with the Revised U. S. Standards for Grades of Extracted Honey, which have been effective since April 16, 1951 and which supersede standards of an earlier date.

Miscellaneous: Reports indicate that the San Antonio public health service imposes rigid requirements of honey packed in the city. Operations must be conducted in a building distinct from a dwelling, provided with concrete floor, hot and cold water, and other features and located in a business zone. While there is no question as to the desirability of the sanitary standard, restricting the location to a business zone will work a hardship on small producers who pack honey.

Texas beekeepers regret to learn of the passing of Frank C. Pellett, eminent naturalist, beekeeper and authoritative writer. Mr. Pellett is held in high admiration in Texas from his writings and extensive visits to our State. His world famous honey plant garden at Atlantic, Iowa, remains as a living memorial in his memory.—A. H. Alex, College Station, Texas.

MAINE, May 30

Weather: Spring weather has been the kind to please the average beekeeper with plenty of rain during March and April, followed by sunny days and cold nights. It would seem that nature is running on schedule this year in this section of the state.

Plants: Willow, red maple, and wild cherry started to bloom early in protected areas facing the South, and the fruit tree bloom has come and nearly gone. This will be followed by the berry blossoms that are fine nectar producers. These conditions go a long way toward encouraging the beekeeper.

Condition of Bees: The report has been good as to the condition of bees that wintered through, with early pollen gathered, causing the bees to build up fast. At this time several beekeepers have reported swarms. Package bees from the South were received in fine condition this spring. A great deal of credit is due breeders for producing better queens.

Honey Market: The honey market is steady. Most of the local honey produced has been sold. There are some shipments being received from out of the state at this time. Prices are about the same as last year, too low to be in line with other inflated prices.

The price of wax will continue to be high because the trend is toward more comb honey wanted; also junk honey is having its day. This will cause less wax from the sources of cappings and combs.

Beekeepers should produce both extracted and comb honey. This enables them to supply a complete market demand.

Miscellaneous: At the annual meeting of the Maine State Association of Beekeepers held at Orono, April 5, the following officers were elected: Pres., John Plummer, Pittsfield; Vice-Pres., Walter Gerald, 100 Winter St., Portland; Sec.-Treas., Robert E. Olson, Plant Science Bldg., University of Maine, Orono, Me.; Librarian, James Wiggins, 110 Rockland St., Portland.

The first summer meeting for the Maine State Beekeepers' Association was held Sunday, June 24, 1:00 P. M., at the home of John Plummer, Pittsfield, Maine.

I have been asked to give talks to club groups this spring on bees, and there has been a great deal of interest shown. There is a grand opportunity for the beekeeper to arouse interest in beekeeping by doing a little preaching.—Edward M. Wills, Kent's Hill, Maine.

ONTARIO, June 6

June again and the beginning of our main honey flow is about two weeks distant. The short period between June 15 and 18 and August 1st is the one on which we will build all of our year's hopes, and toward which our energies for the other ten and a half months of the year are directed. Beekeeping, in my opinion, is the greatest gamble on earth. The commercial beekeeper must pay his help for the season, invest his own labor, and money for supplies, containers, etc., on the chance that the comparatively short season will yield sufficient returns to cover expenses, and reimburse him to the extent of maintaining the standard of living demanded in this 20th century. A spell of unfavorable weather during that critical period may mean a comparative failure. On the other hand favorable weather may tip the scale heavily in the other direction. It is on that whim of nature that we all gamble, and the odds are heavy. Sometimes I wonder why anybody engages in the business. I am quite sure none of our captains of industry would invest a plugged nickel in any business with comparative risks. It must be that money is a secondary consideration with beekeepers.

Our weather for the past month has been normal for the season. Several cool spells alternating with some real warm days have given us typical June weather, with enough showers to keep vegetation growing nicely. At present the soil is well supplied with moisture, and hay and grain crops are flourishing. Clovers are looking particularly fine, but they are principally red clover and alfalfa, if the latter can be termed a clover. Neither of these are of great importance as nectar producers, being cut for hay in early stage of development. There is considerable sweet clover in evidence along

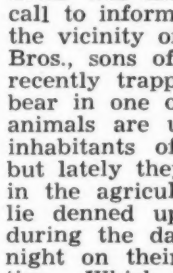
roadsides and gravel pits, and in the rougher sections, the blue weed is plentiful. Basswood trees are well loaded with buds, but unfortunately hordes of tent caterpillars are defoliating these trees, and it is possible the buds may never develop into bloom. Every ten or twelve years these caterpillars increase to plague proportions and reach a peak, when they are attacked by parasites and disease which reduce their numbers to negligible proportions for a few years, when the cycle commences all over again. Last year in forested areas in the northern section of our country the trees were stripped so bare of leaves that one might be pardoned for believing it was midwinter. Many trees thus stripped of foliage manage to grow a second crop of leaves later in the season, but many more are weakened and die.

Miscellaneous: June is the month for beekeepers' meetings, and field days here in Ontario. The Province is divided into districts, each district comprising four or five counties, and each district usually has a field day. On June 5th the local meeting was held here in our own city, with Prof. Townsend of Ontario Agricultural College giving a very enlightening illustrated address on the work being done by the legume research committee on seed production and pollination. Prof. Townsend outlined results of work done to discover the pollen and nectar gathering habits of the bees, and their relation to the number of colonies required and method of locating colonies in clover fields to obtain maximum results. It is significant that the farm journals are now devoting considerable space to the importance of the honey bee, and more farmers are asking for information.

Tom Shield, manager of Ontario Honey Producers' Co-operative, analyzed the market situation as regards stocks on hand and sales volume. Sales had shown a good deal of variation since January 1st, alternately rising and declining, but the situation is satisfactory as regards stocks on hand, which are not abnormal for this season.

Bears are giving considerable trouble this spring. One of my yards was visited a few nights ago, but only one colony had been destroyed when the raid was discovered. We have a trap set and hope to lay the marauder by the heels—literally—in short order. The writing of these notes was interrupted by a phone call to inform me that one was in the vicinity of another yard. Byer Bros., sons of the late J. L. Byer, recently trapped and shot a large bear in one of their yards. These animals are usually thought of as inhabitants of the forested areas, but lately they are learning to live in the agricultural areas, and will lie denned up in a farm woodlot during the day, and sally forth at night on their mission of destruction. Which adds one more point to my contention that beekeeping is a gamble.—Allan T. Brown, Peterborough, Ontario.

COLORADO, June 7



Weather: There has been no shortage of weather the past few months. Spring brought everything, and even included some much-needed rain the first part of May. The condition of the snowpack has been improved and in most areas there seems to be enough insured for irrigation water throughout the summer. Here in Northwestern Colorado five counties have signed up for a cloud-seeding program which is now just one month old, and of course it is too early to evaluate its worth. All I can say is that during the past month we seem to have had an excess of windy, cloudy weather. Some of the old timers are saying that it is easier to make wind than it is to make water.

Bees wintered well in western Colorado. Cold spells were of short duration, and well-provisioned colonies came through with considerable strength. The dandelions and early wild flowers bloomed profusely, but so far the cloudy, windy weather above mentioned has kept the bees from taking full advantage of the situation. As a result many colonies in less-favored locations will have to be fed yet this month before the white honey flow begins. This is not unusual, however, as any surplus stored from an early flow is usually

converted into brood and bees before the June dearth is ended by the bloom of yellow sweet clover late this month.

Market: It is hard to believe, but the local market actually seems to be reviving. It was dead so long that we almost despaired of ever seeing the day again when honey would be in brisk demand in the local markets. The packer demand from outside our area has been fair to good all winter. Being a sparsely populated area we naturally produce a great deal more honey than is consumed in the region itself, and a large part of our crop goes to eastern and southern markets as well as to the West Coast.

There is no doubt but what the government program has helped the market, but the level is still too low. Even at 10c there is far too great a spread between the price of honey and the price of beef or practically anything else one can mention. If we could "beller" like a calf, which is what the noise the meat producers have been making lately reminds me of, we might be more successful in getting the support price of honey raised. Of course, I guess we could all quit producing honey. And then do what? One of the basic troubles with our industry is that it is too easy to get in and too hard to get out. It is far from easy to buy new equipment any more. And when the stock of supplies now in use are worn out and have to be replaced it may put our product on a different basis when it goes to market.

Our Colorado Honey Marketing Order goes into effect July 1. It will be interesting to see what changes result from its enforcement. Its major purpose to date has been to provide for better grading and description of honey, and to keep low-grade honey off the consumer market. No price-posting program will be put into effect at this time, but I believe this will have to come before we can realize full benefit from the program. Following that it will take a genuine advertising program, cooperated in by both producers and packers. As long as honey is in surplus supply it is going to take some aggressive sales activity to sell it to the consumer. Of course, people know that honey is good, they just don't get reminded of it often enough.—John W. Holzberlein, Jr., Meeker, Colo.

The Hope of Every Beekeeper

This apiary belonging to A. L. Coggshall, New York State, shows a good honey location, and is well protected.

A Talk to Beginners

M. J. Deyell

More About Swarming

A few days ago I visited one of my small apiaries west of Medina and found a swarm of bees in a pile of empty supers at the side of the yard. The bees had gained entrance through a small opening which really should not have been there. However, it may be an advantage to have some empty hives with combs in an apiary. If a swarm issues and does not have an empty hive to enter, it may leave for the woods.

I transferred the bees over into an empty hive but did not see the queen. Last evening I was out there and found the bees working in their new hive, as well as the queen. I have not yet taken time to find out where or from which hive the swarm came. Possibly it came from some other apiary near by.

A Little Trick in Swarm Manipulation

I have referred a few times to my experience in northern Michigan during 1917 and 1918. The beekeeper from whom I bought the bees put me on to a little trick in handling a swarm. I am passing this on to you.

This beekeeper was a comb honey producer and clipped the wings of his queens. During the middle of the day when swarms were apt to issue, he had in his hip pocket some small wire cages which he had made. They were open at one end and were used in catching queens as they issued from hives with swarms.

I remember one morning when swarming was bad, of seeing six swarms issue, not all at once, but in the course of a half hour. As a swarm came out I would watch for the clipped queen and finding her, I would put her in the cage I had ready, then put the cage with the queen into the entrance of the hive. In due time the bees would return to the hive. I usually put a stick or stone on the hive so that I would not forget which hive had cast the swarm. After the six queens were caught, caged, and put into the hive entrances, I then went back to the hive that swarmed first, and by that time all of the bees had returned to the hive. The brood chamber was examined and all queen cells de-

M. J. Deyell

stroyed but one— the best-looking cell. The caged queen was hung between combs of the top super. In comb honey hives, the caged queen was placed at the inside of the super beside the follower board. In about two weeks I would find a young laying queen in the brood chamber below. The bees would tolerate the old queen in the top super. As a matter of fact, I have kept queens caged in this manner for six weeks. If the queens had not outlived their usefulness, they would be used in the yard; if they were old and worn out they would be killed.

This appears to be a good method of holding a colony together instead of dividing it, as is done when the parent hive is moved on to a new stand and the swarm put into a new hive on the old stand. If the beekeeper does not care for an increase in his apiary, this is a good method to follow. If any of you should try out this method, let me know how it works for you. I know that it worked well in northern Michigan.

In attempting to explain why this method works, it would seem that the presence of the old queen caged in the top super has a tendency to hold the bees in the hive. There being only one queen cell in the brood chamber, the bees would not be likely to swarm even after the virgin queen emerged from the cell. If swarming is very bad, the bees might build more queen cells if they had young larva the right age for

developing cells. However, this never happened in northern Michigan when I tried this method.

Be Sure to Put on Supers in Time

Much honey is likely to be lost due to the lack of storage space in hives. This congested condition also brings on swarming. It is much better to give a few too many supers than too few. It is amazing what populous colonies will do in storing honey when conditions are right.

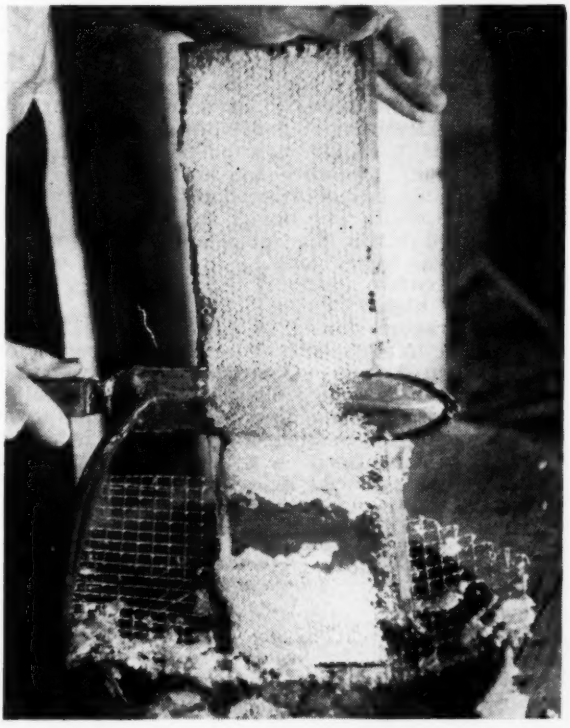
Taking Off Extracted Honey

Beginners, as well as more experienced beekeepers, should be warned not to remove honey from hives until it is properly cured or ripened by the bees. Honey with a high moisture content is likely to ferment. During a wet season it is difficult for bees to drive the excess moisture from the nectar. During a dry season, moisture is expelled from the hives quite easily by the bees and the honey is ripened quickly. A good rule to follow is to leave the combs in the supers until they are at least three fourths capped over. It may not be possible to have all combs entirely capped over. The bees usually leave a few uncapped cells, presumably as food for the bees in the event of a dearth of nectar.

The beginner is usually anxious to taste some honey that his bees have produced. If section comb honey is being produced, it is possible to remove three or four sections from the middle of the super in order to have some for table use. The remainder of the honey may be left on until the bees have finished capping it.

One method of removing supers of honey from hives is by means of a bee escape. This small device fits into the opening at the center of the inner cover. The bees enter a small hole in the top of the escape and go on down through two pliable springs into the brood chamber below. They are unable to return through the springs. If a bee escape is put under one or more supers in the afternoon, the bees will probably be out of the super by the following afternoon. The supers can then be carried into the honey house.

Back-lot beekeepers do not need large extracting outfits. In fact, it is possible to handle honey from 25



A steam-heated uncapping knife in use. Please note that the cappings are shaved off—starting at the bottom of the comb. It is well to keep one's left hand out of reach of the sharp knife.—Photo by R. Ridgway, Jamestown, No. Dak.

A swarm on a branch that was cut off. The bees are to be shaken into the hive. Bees in a swarm very seldom sting as they are filled with nectar.—Photo by James J. Smith, Buffalo, N. Y.

or 50 hives with a two or three frame honey extractor. Be sure the machine is properly anchored. Where electricity is available, a small 1/6 H.P. motor may be used to advantage. Be sure to do the extracting in a basement or building that is bee-proof. The honey should be extracted during the hot weather, if possible, as honey may be thrown out of the combs easily if the temperature is high.

The extractor should be fastened to the floor to prevent it from rocking while in motion. Combs of approximately the same weight should be selected so the machine may not be thrown out of balance. After the combs are uncapped with a hot knife, they are placed in the basket of the extractor and part of the honey should be thrown out of one side of the combs, which requires only a few revolutions, then the combs are reversed and all of the honey is thrown out of the opposite side. The combs should then be reversed again and all of the honey thrown out of the first side. This avoids placing too much strain on the midrib of the combs and results in a minimum of comb breakage.

During hot weather, honey direct from the extractor will strain quite readily through two thicknesses of cheesecloth. If the weather is cool, it may be necessary to heat the honey before straining. Do not overheat because this might destroy the delicate flavor.

Getting the Food Chamber Filled for Winter

This may seem rather early in the season to talk about the food chamber being well filled for winter but in reality July is the month we should be considering this problem. This applies mainly to beekeepers in areas where the clover honey flow constitutes the main crop and where there is little, if any, fall honey flow.

It has been demonstrated beyond a doubt that the two-story or food-chamber method of wintering bees is preferable to single-story wintering.

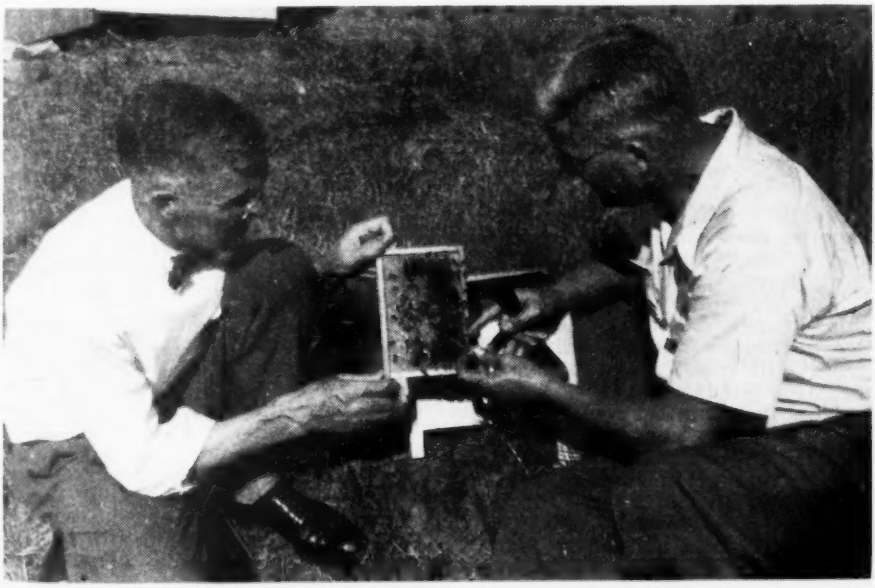
However, there are some who remove all surplus honey from above a single-story brood chamber, then feed sugar syrup for winter stores.

This can be done but it is rather expensive and time-consuming. In our opinion, a two-story brood chamber is likely to have much more honey and pollen in the combs than a single-story colony.

During recent years, The Root Co. has kept bees in western Ohio, also in eastern Ohio. In western Ohio where we have bees, there is no heavy fall honey flow; in eastern Ohio, around Medina, there is usually a good fall flow. It seems necessary in western Ohio to confine the queen down to a single-story brood chamber during July in order that the food chamber, just above the brood chamber be well filled with honey. If the queen is left in a double brood chamber, she will probably occupy the upper brood chamber or food chamber in late summer. This may leave very little honey in the food chamber. That is why we advocate putting a queen excluder under the food chamber during the late summer and fall months, especially in areas where there is no heavy fall flow.

Here in eastern Ohio and similar areas, where there usually is a heavy fall flow from golden rod and aster, we like to have a queen excluder over the double brood chamber, or on top of the food chamber. When the nights get cool in late August and September bees are likely to fill the food chamber and drive the queen down into the bottom chamber. If the flow continues, bees will store honey above queen excluders in the supers. Such management helps to insure having the food chamber well filled, in addition to some honey in the lower chamber. Sixty pounds or more of honey in each double brood chamber hive, when the bees go into winter quarters, is not too much. None of this honey is wasted. It is converted into bees the following spring and the very populous colonies are ready to store a surplus even from the spring honey flow—not to mention the major flows later on.

When we receive letters from beekeepers over the country complaining of the poor condition of their colonies early in the spring, shortage of stores, weak colonies, etc., it seems apparent that much of this trouble could be averted if only each beekeeper made it a point to have a superabundance of stores on each colony late in the fall. It seems obvious that some of the so-called winter loss of bees cannot be attributed to lack of protection but rather to an insufficient amount of food.



Jack Deyell, left, talking queen rearing with Dr. D. Donavan, at Clemson, So. Car.—Photo by W. A. Stephen, Extension Apiarist for No. Car.

American Honey Institute News Notes

By Harriett M. Grace, Director
Commercial State Bank Building
Madison 3, Wisconsin

Best-sellers don't always refer to books. Beekeepers often wish they could apply the term to their honey.

Indeed, sometimes they can. Sometimes honey slips from their fingers into the customers' with scarcely an effort. The season has been good, the market active, the demand great.

But then again, there are times when honey moves slowly, without the whirlwind of buying that makes for good sales. It is during these times that the best-seller idea must be put to use.

For honey becomes a best-seller only if the man who is selling it is a best-seller himself. That very simply means that beekeepers who sell their own honey to the consumer must know the rudiments of good selling techniques. They must know customer psychology. They must know how to make their product seem far superior to any other.

That means they must know the basic principles of good packaging, good displays and good merchandising methods.

What are they? Here's where you must do a bit of research on your own.

Start out with number one, good packaging. Take a pad of paper, a pencil, and a good pair of walking shoes. Then tour through some of the leading grocery stores in your community. Jot down what packages catch your eye. What color are they? What size? What type of printing? What's included on the label? How many colors do they use? What type of brand name do they have?

Put all your answers down on your paper. Then go home and score them. You'll learn quickly what will make an attractive, eye-catching package.

Now for number two, good displays. Here again your paper and pencil will come in handy. What part of the store are the best displays in? How many items do you need in one display? How is the display counter laid out? Can the customer handle the merchandise? How many posters do you need?

The honey posters sold by the American Honey Institute should come to mind immediately when you finish your survey. You can't display a product unless you have colorful placards to tell what you are displaying.

Don't think that this survey can be done in fifteen minutes. It can't. Take a day to do it, and do a thorough job. The time will be well spent.

And then question number three, namely, good merchandising methods. Thanks to the American system of distributing information through public libraries, everyone has the opportunity to find out exactly what he wants to know. Your public library has books and books on good merchandising methods. Ways to sell, places to sell, and tricks to selling — every beekeeper who is starting out in the business (and many of those who have been in the business for a good many years) could profit by a few evenings at home in the company of these worthwhile books. Your librarian will be glad to recommend several of them to you.

One good merchandising principle found in every book will be the basic idea that you must make the consumer interested in your product. The American Honey Institute is founded on this very principle alone. The recipe leaflets and books that we offer to you at cost are aimed at producing consumer interest in honey; you must see that they get to the consumer in the first place.

The national advertising we do has as its prime purpose the creation of a national interest in honey.

These spring and summer months have brought a great flood of mail to the Institute office from interested beekeepers who are eager to learn just how they can best sell their honey. Gladly the Institute offers suggestions, sends them leaflets, newspaper mats, posters or streamers for their displays. It is the Institute's job to support the work of the individual beekeeper in marketing his honey. Make use of your Institute; its services are yours for the asking!

Let's Pep Up Our Organization

By R. Parker Hamilton
Past president of the North Jersey Beekeepers' Association

If you are the president of a beekeepers' association or in line for that position at some future date, you have on your hands one of the hardest tasks ever given a beekeeper. Bees are the simplest things in the world to handle, after trying to please everyone in the association.

Since the bulk of most of the beekeepers' associations in this country are made up of back-lot beekeepers, we must learn to please a wide variety of people.

Meetings must be fast moving, so that the members do not get a chance of becoming uneasy in waiting for the next part of the program. The business portion of the meeting should be breezed through.

You will find it to your advantage to keep a close contact with the local newspapers and your publicity agent should be one of the key men in your organization.

The closer the contact with newspapers, the better your organization will be. In many cases these newspapers are only too glad and willing to donate ribbons for a honey exhibition in other activities of the association. However, your association must take it upon its shoulders to make presentations to these men in charge of the local newspapers, from time to time. A cigarette lighter or watch presented from time to time will pay big dividends to your organization.

A public relations man is another key position which must be filled if your organization is to be a live-wire one. He should keep in contact with local merchants who from time to time will be eager to award prizes for the publicity derived, especially if the organization publishes a news letter, for example,—a local jewelry concern may be quite willing to donate one or two inscribed plaques every year for a membership contest or something of that nature. Two or three jars of honey from time to time will keep these merchants ever willing to assist in your activities.

If the organization is financially able to support a monthly or quarterly news letter, this organ will become the back-bone of the entire association, and should be under the personal direction of the president. It must list new members, notices of all coming meetings, a resume of any good lecture given at a meeting of its own association or neighbor association, the full financial statement of the treasurer, and this is a most important item, since it is the members who do not attend the meetings who are most anxious to know the condition of the association.

A meeting of the executive committee should be held at least every two months. Each and every officer should have exact and certain duties.

Good speakers must be secured for every meeting, remembering that one poor speaker can cause ten or more people to stay away from the next meeting. Raffles for the collection of funds should be dealt with, with exactness and speed, and it must be remembered that the prizes must be attractive and have appeal, although it is wise to have on hand two or three consolation prizes.

The business at outdoor meetings should be minimized and the activities one on top of the other. Smoker-lighting contests are always lots of fun; catching the most drones in a bottle is always fun to watch when the ladies do it; or catching worker bees in a bottle by the men disqualifying each as he is stung, is more fun than the steeplechase; a quiz contest between two teams always produces plenty of laughs.

Summer meetings should always be held where there are plenty of hives for inspection. A contest between two teams of three to see who can find the queen first in a designated hive usually provides plenty of thrills. The entertainment chairman at summer meetings is the king bee because it is he or she that is responsible for the refreshments. A recess for eating and swapping of stories should be restricted to half an hour.

In North Jersey, Westchester, and Bronx Counties, New York, we have formed a Board with three representatives from each group which has helped to bind closer together these neighboring beekeepers, al-

(Continued on page 435)

Just News

The Westchester County Beekeepers' Association will hold its regular monthly meeting on Sunday, July 15, at 2:30 P. M. at the home of Mr. and Mrs. Fortuna Piasentini, 96 Hoyt Street, Darian, Connecticut. A guest speaker is expected to be present to give a talk on research in beekeeping. Weather permitting the meeting will be held outdoors.—A. M. Barnes, Publicity.

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The Eastern Branch Tennessee Beekeepers will meet on August 3 at Avondale Springs, Granger County, for an all-day meeting. A cordial invitation to all.

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The Annual meeting of the **Wisconsin Beekeepers' Association** will be held at West Bend on July 24 and at Ladysmith on July 25.

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The Berk's County (Pa.) Beekeepers' Association will hold its summer meeting on August 4 at the road stand of Ontelannee Orchards on Pottsville Pike, one half mile from Leesport.

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The 60th Anniversary celebration of the **Connecticut Beekeepers' Association** was held April 21 at Hartford with about 100 in attendance. Dr. E. F. Phillips of Ithaca, N. Y., was the out-of-state speaker.

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The North Carolina Beekeeper's Association is combining vacation entertainment with business at the summer meeting at Cullowhee, N. C., on August 10 and 11, this year, by arranging for the beekeepers to bring their families and see the famous Cherokee Indian Drama, "Unto These Hills". Rooms for families or individuals will be available in the dormitories of the Western Carolina Teachers' College from August 9 through the 13th, with linens furnished, at the rate of $1.00 per day per person. Meals will be furnished at $.75 each. Reservations should be made with W. A. Stephen, Extension Beekeeper, N. C. State College, Raleigh, N. C. by July 31. Excellent programs are being arranged by Mr. Stephen and by Mr. P. J. Gibson, county agent, in cooperation with local beekeeping clubs. Several well-known out-of-state speakers will be guests. Contests will be held and prizes awarded. Beekeepers should bring smokers and veils, as inspection of colonies (including disease) will be made.—Eugene B. Finch, Secretary-Treasurer.

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The Middlesex County Beekeepers' Ass'n (Mass.) held their second outdoor meeting at the home and apiaries of President A. J. Baptiste at Concord, Mass., where the "Club Hive" started at their last indoor meeting April 28th at their winter quarters at Waltham with the introduction of a 3-pound package of Italians. The hive was inspected at the May 26th meeting at the estate of Mrs. S. S. Fitzgerald in Weston and the queen, a fine producer, was clipped and painted with the famous "Southwick" painting kit. The further inspection at the June meeting shows that all frames are drawn and eight have brood so we will add another body of foundation during the month and when we meet again on July 28th at the Helmboldt Farm & Apiaries in Westford, Mass., we should have a very strong colony. It would appear now that with continued good honey weather the club hive may produce some surplus this year and the member who wins the hive will have a good strong colony for wintering next fall. The Association will have a special meeting and goodwill visit on July 14th at the summer home of Member Prof. Robert Cheney, at York Beach, Maine. It will be recalled that Prof. Cheney was the show chairman at the Middlesex Co. Bee Display this spring in March under the auspices of the Mass. Horticultural Society, when our association won the Special Silver Medal for the display of Italian Bees.—John H. Furber, Sec.-Treas.

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The **On-to-Europe Tour** to the International Beekeeping Congress at Leamington Spa, England, September 3 to 8, 1951, will include visits to England, Scotland, Holland,

Belgium, Luxembourg, Switzerland, Italy, and France. If interested, write Julia L. Sykes of U. S. Travel Service, Inc., 43 West 56th St., New York 19, N. Y.

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The mid-summer meeting of the **Ohio Beekeepers' Association** will be held in Medina, August 7 and 8. Many prominent speakers have already signified their willingness to appear on the program. James I. Hambleton, of the United States Bee Culture Laboratory, will be present. There will be two forums, one conducted by Dr. W. E. Dunham, of Columbus, on "Beekeeping Problems of 1951," and the other by Irvin VanDevier, of Medina, on "Beginners' Problems." The sessions will be held in the dining hall at the fairgrounds and the banquet on Tuesday evening will be in the basement of the Methodist Church. A number of county associations are sending delegations and a good attendance, therefore, is expected.

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Iowa and Nebraska beekeepers will have a joint summer meeting to be held at Council Bluffs, Iowa on Saturday, July 14th. The committee has arranged for a full day of varied activities that should be of interest to everyone. The speakers for the afternoon portion are as follows: John Tideswell - Legume Pollination; Glenn O. Jones - American Beekeeping Federation Today; Mrs. Harriett Grace - Your American Honey Institute; Edward A. Wolfe - Marketing your Produce; Alan Root - Washington, D. C., and Beekeeping. All beekeepers and their families are invited to attend. Bring a contribution for the pot-luck dinner at noon at Kewanis Point. Also bring plate and utensils, hammer, smoker, and favorite smoker fuel. The day begins with an open house at the A. I. Root Company plant at 9:30 a.m.—R. J. Walstrom, Extension Entomologist.

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The North-Western Pennsylvania Beekeepers' Association will hold its annual picnic at Canadota Lake, Pa., on Wednesday, July 25, beginning at noon.—Mrs. Eva M. Moore, Sec.-Treas. Crawford Co. Beekeepers' Assn.

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New Jersey Beekeepers' Association Meeting— Time: 10 A. M., Saturday, July 21, 1951. Place: Log Cabin, Experiment Station, New Brunswick, New Jersey. Program: Meeting called to order, and Robert S. Filmer will introduce our speaker of the morning, Dr. Stacy Randle, State Chemist. There will be a message from Dr. W. S. Martin, Dean and Director of the Station and also from Dr. B. B. Pepper of the Entomology Department. Dr. Marion Crawford will be on hand to identify your honey plants, so bring them in and find the proper and common names of the plants in your area. Lunch: Big item at any bee meeting. Discussions of bees and beekeeping suggestion—also "stump" the "Experts". Bring your puzzling questions.—M. H. Stricker, Sec.-Treas.

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Coffee and Vanilla Honey

The May number of the **Kentucky Bee Line** quotes a letter from Mrs. Paul Burlingame, Sr., who on a visit to Puerto Rico, visited an apiary of 200 colonies in one location, high in the mountains where bees were working on both coffee and vanilla. Both plants have to have 50 percent shade. Such honeys would be a novelty but probably would not resemble either coffee or vanilla in flavor.

"Oh no! It's just the seven-year itch!"

Asked & Answered

Uniting Two Colonies of Bees

Question: How can I put two hives of bees together making one colony?—Stanley Kurek, Conn.

Answer: We suggest feeding your two colonies to be united some thin sugar syrup made of equal parts of granulated sugar and water. If there is a honey flow on, it is unnecessary to feed syrup. About a quart of syrup for each colony is an ample amount to feed. Pay no attention to queens. Simply set one hive with bottom board removed on top of the other hive with cover removed and place one thickness of newspaper between the two hives, making a couple of holes with a lead pencil to admit air into the upper hive. In due time the bees will gnaw the newspaper away and the two lots of bees will unite. The bees will dispose of one queen and retain the other.

Fencing Against Skunks

Question: In fencing against skunks, how far away should the fence be from the bee hive so it will not bother the bees going out and in?—Neil Butler, Tenn.

Answer: Should you run a wire chicken netting around your hives of bees to keep skunks away, the bottom of the netting should extend into the ground at least one foot. If the bottom of the netting is even with the surface of the ground, the skunks can easily dig under wire netting. This netting should be back from the hives at least five or six feet. If the netting is rather coarse, the bees can easily fly through the spaces in the netting. A shotgun is a handy weapon to have close to the hives about dusk when skunks are likely to molest the bees. Some use strychnine in a hen's egg placed near the entrance of the hive.

Getting Wax from Old Combs and Cappings

Question: How can I get the wax from a few old combs and cappings?—J. A. Stone, Ky.

Answer: Place the old combs or cappings in a burlap sack, then tie the mouth of the sack securely. Place the sack with its contents in a boiler containing water, over a gas hot plate. A brick or similar object may be placed on top of the bag to keep it underneath the water, which should be brought to a boil for 10 or 15 minutes. As the melting point of wax is approximately 145° F., the hot water will melt the combs and cappings and the melted wax, being lighter than water, will rise to the surface. When the fire is turned out and the water cools, the liquid wax will congeal in a solid mass on the surface of the water and can then be lifted off. The sack retains most of the foreign matter that might be present in the cappings or old combs. This is a simple way of saving most of the wax and does not involve the use of any expensive bee equipment.

What to Do with Granulated Honey Combs

Question: I have three standard supers and three or four shallow supers of candied honey in frames which I could not get extracted last season. Where should I put them on hives so the bees will clean them out so I do not have the same trouble at the next extracting?—John Weidenheft, Ohio.

Answer: Regarding your supers containing combs of granulated honey, if you will put one super underneath each brood chamber, that is, this super of granulated honey to be placed next to the bottom board and if you will score the cappings of the combs containing granulated honey, the bees are likely to remove the honey from the cells of the comb and carry it up into the brood chamber or supers above. Bees work up rather than down in the hives. This should be done before the main honey flow begins. We suggest that if you do this, the work be done rather late in the evening so as to avoid having the bees stirred up too much. Naturally when there is very little honey coming in, any combs of honey given to bees will tend to get them excited and if this honey can be added late in the evening, the bees are likely to clean up any honey that might fall on the bottom board of the hive as a result of scoring the cappings of the combs. It would be well also to place entrance reducers in the hives at the time you give the supers the honey and leave them in the entrance until danger of robbing is over. Entrances should be reduced down to about 2" x ⅜".

What's a Swarm Worth?

By C. H. Pease, Canaan, Connecticut

In the "good old days" of our grandfathers when beekeepers encouraged swarming instead of discouraging it, as we do now, there may have been a spark of truth in the old-time popular saying: "A swarm of bees in May is worth a load of hay; a swarm of bees in June is worth a silver spoon; a swarm of bees in July is not worth a fly." Before the advent of the movable frame and honey extractor it was customary to kill the bees and cut out the combs to get the honey in the fall. This necessitated making new colonies by swarming in order to replace those killed—they made more bees than honey in those days.

Of course, a swarm in May, with the whole honey-flow season ahead of it, should be worth much more than one in July after the flow has slackened, but an experience I had last summer convinced me that even as late as the middle of July a swarm of bees saved is worth much more than a whole swarm of flies, and is a good investment. Here's the story:

On July 13, a young man who was mowing the Catholic church lawn, a little more than a mile from me, telephoned that a swarm of bees was hanging on a bush near where he wanted to mow and that he didn't dare to run his mower near them for fear of getting stung. The gist of his message was a hint that he thought I might like those bees in my bee yard and that I could have them if I would come and get them, which I did.

The only bees in the immediate vicinity were about a half dozen colonies in a small apiary a few hundred feet from the church. As they were good Italian bees, the kind this beekeeper had, and although I couldn't prove it absolutely, I would "bet my life" they came from one of his hives.

It was a good swarm and I gave them a ten-frame hive with drawn combs. This was July 13, and, as they started doing business in their new home immediately and appeared to be doing well I gave them a shallow super 12 days later, July 25. On October 5 the super was taken off and the honey extracted—a little over 20 pounds.

My bees were all moved into my cellar on December 5. All colonies appear to be in fine condition now (February 26) and as my cellar has brought through every colony I have owned since 1920 (31 years, with a total of over a thousand colonies) without a single wintering loss, I think I have reason to believe that this colony will come out in the spring and make a good account of itself the coming season.

To recapitulate: As we sold all of our honey crop last season at 30 cents a pound, this July 13 swarm, "not worth a fly," gave me a little over $6.00 in honey, and certainly the established colony in the spring should be worth more than a three-pound package from the south ($4.00 plus shipping cost). To be perfectly fair in the reckoning I will state that, as with all of my cellar-wintered colonies, including this one, I fed 15 pounds of sugar syrup last fall (the safest of all food for wintering). The sugar to make this 15 pounds of syrup cost less than a dollar (94c), which, being deducted, leaves a net total income of over $5.00 in cash from this colony, and a fine colony of bees that I wouldn't take $10.00 for now. All of which leads me to surmise that, if this July swarm was "not worth a fly," certainly, in this case, the high cost of flies must have gone away beyond parity.

I have never believed that it pays to lose swarms, regardless of when they come out and I don't lose any—I can't remember when I lost the last one. Had the owner of that colony that swarmed last July saved it, it would have cheated me out of a fine colony of bees and over $5.00 net from the honey they gave me.

(Continued from page 431)

though all three organizations are of the firm belief that a strickly local organization can do more good than any type of branch organization. This Board issues diplomas to beekeepers who have qualified in a course prescribed by the Board.

And so if you are an officer in any beekeepers' association, and may some day become its president, you will have on your hands one of the toughest jobs ever created.

The beekeeping class of 1950 at State College, Pa.
(A few hurried off to dinner before this picture was taken.)

Beekeeping Short Course at State College, Pennsylvania
August 20 to 24, 1951 Inclusive

(Tentative)

Monday A. M. Registration
Monday P. M.
1:30 Announcements
1:45 Display of hive parts and explanation of terms used in beekeeping.
2:00 Secrets of the Hive.—E. J. Anderson.
3:00 Inspection of the laboratory and equipment.
4:00 Assembling equipment and demonstrations on the uses of beekeeping gadgets.
Tuesday A. M.
8:30 Making a Start in Beekeeping.—W. W. Clarke.
Bees, how and where to buy; Equipment to use; Location; etc.
9:15 Care and Introduction of Package Bees.—George Rea.
Time to purchase and install; Equipment needed; Early steps in management.
10:15 Spring Management.—E. J. Anderson.
From January to June.
11:00 Colony Activities and Characteristics.—W. W. Clarke.
Division of labor by age and sex; The brood cycle; Feeding of the young; etc.
Tuesday P. M.
1:30 Work in the apiary:
1. Checking the condition of the bees for comb and extracted honey production, including: a, brood, b, queens, c, comb, d, queen cells.
2. Clipping queens.
3. Removal of honey from the hive: a, by bee escape, b, by shaking bees from the combs, c, by carbolic cloth.
4. Study of queen mating hives, including types, method of feeding, etc.
Tuesday Evening.
7:30 Honey Producing Areas of Pennsylvania.—E. J. Anderson.
Slides on honey plants of Pennsylvania.—W. W. Clark.
Wednesday A. M.
8:30 Colony Morale and Swarm Control.—E. J. Anderson.
9:30 Care of Honey from Hive to Market.—George Rea.
1. comb honey.
2. extracted honey: a, removal; b, extracting; c; storage.
10:30 Requeening.—W. W. Clarke.
Finding the queen; smoke method of introducing; cage methods of introducing; dip methods of introducing.
11:30 Fall Management.—E. J. Anderson
Wednesday P. M.
1:30 Demonstrations on:
1. Shaking package bees into cages.
2. Introduction of package bees into hives.
3. Transferring bees from a box to a modern hive.
Wednesday Evening.

7:30 Movies: "Realm of the Honey Bee"

8:15 Composition and Properties of Honey.—E. J. Anderson.

Thursday A. M.

8:30 Management of Bees for Comb Honey Production.—E. J. Anderson.

9:30 Queen Rearing Methods.—George Rea.

10:30 Management of Bees for Extracted Honey Production.—W. W. Clark.

11:30 Races of Bees.—E. J. Anderson.

Thursday P. M.

1:30 Making queen rearing equipment (by all students) which includes: cell molds, grafting needle and spoon, cell bars.

3:00 Grafting queens in the apiary, with the equipment made by each student, and other work with queen rearing colonies.

Thursday Evening.

7:30 Artificial Insemination of Queens.

8:30 A.F.B., E.F.B., Nosema, Isle of Wight Disease and the bee louse displayed under the microscope.

Friday A. M.

8:30 Marketing Honey.—E. J. Anderson.

9:15 Diseases of the Honeybee.—W. W. Clarke.

10:15 Enemies of the Honeybee.—George Rea.

11:15 Management of Bees for Pollination.—W. W. Clarke.

Friday P. M.

1:30 Extracting, straining and bottling honey previously brought in from the bee yards with: back lot equipment; commercial equipment, some of which is newly designed. Demonstrations on the care and uses of beeswax.

Friday Evening.

7:30 Presentation of a new film on the honeybee.—W. W. Clarke.

Honey tasting contest.

Refreshments, games.

You Can Learn to Like It

By H. H. Root

When I was a youngster I would not eat tomatoes, string beans, peas, nor carrots. My mother used to say that one must learn to like them. Today, my main concern is to get enough of them.

For years, the only honey I did not like was buckwheat honey. Buckwheat comb honey was not so bad and my first taste of granulated buckwheat honey packed by the Dyce process surprised me. It was good.

Last fall my son brought me a shallow comb of nicely capped fall honey. Scarcely half a mile from his bees was a very large field of buckwheat. The bees had stored a lot of this buckwheat honey and during the late summer it was ripened and fully sealed. In some of the combs lighter honey from heartsease was closely stored around the buckwheat. David said he brought it to me because his wife and children would not eat it.

Few people can resist comb honey so I decided to have some of that comb honey every morning for breakfast. By the fourth morning I was going after the darker honey. Maybe it was the whole-wheat toast that furnished the perfect setting for the dark, sparkling honey. An attractive appearance always helps but it was not the appearance alone, for in a week I wanted that buckwheat honey and not because my boy had given it to me, either. I liked those cells of dark honey and the liquid honey that came to the bottom of the dish was good, too. The honey was so thick that the light and the dark did not blend into one color. In four or five days I had learned to prefer buckwheat honey, and that fact dawned on me suddenly.

Buckwheat in full bloom has always fascinated me. The bees seem to realize that they have a whole day's work to do between nine and eleven in the morning and they hustle!

Buckwheat griddle cakes have always been my favorite. My wife can have all the prepared wheat flour griddle cakes she wants but give me the good, old fashioned straight buckwheat.

Finally, I like buckwheat honey. I have no quarrel with those who like a water white honey but from now on I want honey with some zip to it.

Please pass the buckwheat honey!

Buy and Sell

Only responsible advertisers and honest advertisements will be admitted to these columns. References required from new advertisers not known to us. Rate: 15c per counted word, each insertion. Each initial, each word in names and addresses, the shortest word such as "a" and the longest word possible for the advertiser to use, as well as any number (regardless of how many figures in it), count as one word. Copy should be in by the 10th of the month preceding publication.

HONEY FOR SALE

WE BUY AND SELL all varieties of honey. Any quantity. Write us for best prices obtainable. The Hubbard Apiaries, Onsted, Michigan.

NEW CROP of honey shipped daily from producer in Florida. Pure orange blossom, 5 lbs., $2.25; Pure Florida cut comb honey, 5 lb. pail, $2.75. No C.O.D. orders. All shipments prepaid. E. R. Raley, Daytona Beach, Florida.

ANY GRADE—Any amount. Alexander Co., 819 Reynolds, Toledo, Ohio.

CLOVER extracted honey in sixties. Abraham Brubaker, Lancaster, Pa., Rt. 1.

HONEY — White clover, heated and strained, ready for bottling, 15c per lb. in 60 lb. cans. FOB Louisville. Lose Brothers, 206 E. Jefferson St., Louisville, Ky.

IOWA Honey. Extra white. Light amber. New Cans. Truck lots. Russell D. Smalley, Beaver, Iowa.

MICHIGAN'S FINEST WHITE CLOVER HONEY. New sixties. Fully ripened and CLEAN. You will be pleased. Sample, 20 cents. John McColl, Tecumseh, Michigan.

500 cans water white clover honey, 11c per lb. F.O.B. Omaha. John L.Tideswell, 2711 No. 63rd St., Omaha, Nebraska.

New crop Georgia cut comb honey in 20 oz., 2½ and 5 lb. jars. Ready about June first. Wholesale here or delivered. 3000 to 4000 cases. George Bray, Nahunta, Georgia.

FANCY GEORGIA tupelo gallberry chunk comb packed in 2½ and 5 lbs. Valdosta Honey Co., Valdosta, Ga.

COMB HONEY FOR SALE — Will be ready to ship in July. Write for prices. C. W. Schrader, Waterville, N. Y.

HONEY AND WAX WANTED

BEEKEEPERS TAKE NOTICE—We can not guarantee honey buyers' financial responsibility, and advise all beekeepers to sell for cash only or on COD terms except where the buyer has thoroughly established his credit with the seller.

OFFERING 9½ cents lb. for good buckwheat honey. Eastern Food Products, 115 Division Ave., Brooklyn, N. Y.

CASH FOR YOUR HONEY — Light extracted or comb. Regular trade send sample. 60 lb. cans furnished if desired. W. R. Moomaw, Stone Creek, Ohio.

CASH FOR BEESWAX. Write as to quantity and we will quote price. Muench-Kreuzer Candle Co., Inc., Syracuse, N. Y.

HONEY WANTED—All grades and varieties. Highest cash prices paid. Mail samples. State quantity. HAMILTON & COMPANY, 1360 Produce St., Los Angeles 21, California.

ALL GRADES HONEY AND WAX WANTED—Mail samples, advise quantity and cash prices delivered to us. HONEY SALES COMPANY, 1808 NO. WASHINGTON AVE., MINNEAPOLIS 11, MINN.

CARLOADS or less of honey and wax. Send sample and price. Alexander Company, 819 Reynolds, Toledo, Ohio.

WANTED — White and amber honey. Any amount. D. F. Treap, R. D. 3, Box 222, Kent, Ohio.

HONEY AND WAX WANTED — Mail sample. Advise quantity. BRYANT & SAWYER, 2425 Hunter St., Los Angeles 21, California.

CASH for your comb honey and all types extracted. Send sample and best price. Buckeye Honey Co., 3930 No. High St., Columbus 2, Ohio.

BEFORE YOU SELL your clover honey contact us. Send samples and tell us how much you have. The Delaware White Clover Apiaries, 139 West William St., Delaware, Ohio.

WANTED—EXTRACTED HONEY— Clover or light amber. C. H. Denny, Rt. 4, Ravenna, Ohio.

WRITE FOR shipping tags and quotations on rendered beeswax. We buy from one pound up and if you have over 25 pounds let us work it into foundation for you at a 25 percent saving. Walter T. Kelley Co., Paducah, Kentucky.

WANTED — White extracted or comb honey. Send sample. Millersport Honey Co., Millersport, Ohio.

WANTED — Wild Flower Honey with good flavor. State price F.O.B. and amount available. David J. Johnson, Clarendon, Pa.

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We carry a full line of ROOT QUALITY Bee Supplies. Prairie View Honey Co., 12303 12th St., Detroit 6, Mich.

WRITE FOR CATALOG — Quality Bee Supplies at factory prices. Prompt shipment. Satisfaction guaranteed. The Hubbard Apiaries, Manufacturers of Beekeepers' Supplies and Comb Foundation, Onsted, Mich.

The only comb foundation plant in the East. We sell foundation, work your wax, render combs and cappings. Robinsons' Wax Works, R. D. 3, Auburn, N. Y.

QUEENBEE PAINTING OUTFIT, $1.50; colony records. 10, 15c postpaid. Southwick Apiaries. Waban, Mass.

BEE SUPPLIES of all kinds. Catalog free. Hodgson Bee Supplies, Ltd., 565—13th Ave., New Westminster, B. C., Canada.

YOUR WAX WORKED INTO quality medium brood foundation, 23c pound; 100 pounds, $18.00. Medium brood foundation for sale, 80c pound. Fred Peterson, Alden, Iowa.

THE BIGGEST BEE SUPPLY Catalog published (64 pages) free for the asking. Listing many items not found in other Catalogs. No agents—buy direct and save 20%. WALTER T. KELLEY CO., PADUCAH, KENTUCKY.

FOR SALE — Three half-ton storage tanks, new standard frames and hives, nailed and painted, used bottom boards. Homer Van Scoy, Candor, N. Y.

FOR SALE — Electro-Flo Filling Machines. Designed for Honey. Fills containers automatically. Write for information, or see in operation. Hancock Honey House, Hancock, Iowa.

USED bee equipment cheap. State your wants. Also a shoemaker's outfit, cost $2500, will take $500. H. G. Quirin, 400 South West St., Bellevue, Ohio.

BEEKEEPER'S SUPPLIES — Write for complete price list. Also special sale at cost on section foundation Root's Thin regular J-3 and Dadant's thin surplus J-3103 to close out stock. Roscoe F. Wixson, Dundee, N. Y.

FOR SALE—Reversible bottom boards, 10 KD, $10.00; 50 KD, $47.50; 100 KD, $90.00; 150 KD, $127.50. These bottom boards are made of high grade cypress, cut from large trees. Sample, nailed up $1.25. Fred L. Poole, Elizabethtown, N. C. Rt. 2.

FOR SALE — One 4-frame honey extractor, one honey tank, one electric uncapping knife. All practically new and in excellent condition.—T.T.Lockard, St. Francis, Kansas.

800 colonies with complete equipment for 1200, in fertile irrigated dairyland. Always a crop. 24 choice locations. Large honey house. Louis Fritsch, Ronan, Montana.

One to 200 colonies ten frame equipment. Reasonable. Good condition. R. L. McClure, Delmar, Del.

FOR SALE — 125 colonies, 2 and 3 story, in excellent condition. All or part. $9.00 per hive. H. E. Ault, 311 Lewis Ave., Kerrville, Texas.

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Carloads and less than carloads. Mail sample and best prices in all grades.

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Drawer 239
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FOR SALE—700 colonies of bees and extracting equipment, 10-frame size. No disease. Darrell Sparks, Algona, Iowa.

FOR SALE—12 colonies. Plenty of brood and honey.All have added supers almost filled. $10.00 each. L. C. Packer, 330 Pine Street, Westfield, N. J.

50 two-story, 10-frame colonies; also extra supers, covers, frames, and foundation. All reasonable. GEO. OLOWACH, CUSTER, MICH.

FOR SALE—About 15 hives and like new 8-frame extractor; also plenty extra supers. $125 for all. Busch's Bar B. Q., RR 1, Box 84, McHenry, Ill.

Over 700 colonies, sweet clover locations, honey flow from spring till fall. Home, fully equipped shop, honey packaging equipment, and market, etc. Best reasonable offer. Ernest Galloway, Bancroft, Idaho.

FOR SALE—20 colonies, 10 or 20 new hives, 200 or 300 nearly new painted supers, 30 supers full of honey. All Root goods. One 3-frame extractor and honey house 12 x 16 feet. Have truck, can deliver.—John Curtis, 6 miles south and 3 east of Nodaway, Iowa.

FOR SALE—Bee business, home, furniture, equipment, 28 miles north Missoula. Beautiful valley, no blizzards or high winds. 20 acres, partly irrigated, plenty out buildings. 400 colonies, room 800, equipment 500. Ten registered locations, no crowding. Modern bee house 36 by 44, two stories. Alfalfa, sweet clover, alsike pasture Top grade honey, high yields, no failures. Two dwellings, mountain spring water, electricity, oiled roads, store adjoining. Honey sells at door, third above wholesale. Cash price, $20,000. T. J. Rowe, Arlee, Montana.

BEES AND QUEENS FOR SALE

We use all possible care in accepting advertisements but we cannot be held responsible in case disease occurs among bees sold or if dissatisfaction occurs. We suggest that prospective buyers ask for certificate of inspection as a matter of precaution.

CAUCASIANS—Booking orders for 1951. Lewis & Tillery Bee Co., Route 1, Box 280, Greenville, Ala.

GOOD ITALIAN QUEENS, $1.00 each. D. W. HOWELL, Shellman, Georgia.

BEES FOR SALE AND LEASE—Montana, Wyoming, Idaho, Nebraska. Contact Bradshaw & Sons, Wendell, Idaho.

BREWER'S LINE BRED CAUCASIAN QUEENS. 1-24, $1.25; 25-99, $1.15; 100-up, $1.10. Brewer Bros. Apiaries, 3616 Caucasian Circle, Tampa 9, Florida.

IMPROVED ITALIANS, 600-lb. strain, 2-lb. pkg. with queen, $2.95; 3-lb. pkg. with queen, $4.00. Henry Loehr, Jr., Caldwell, Texas.

CAUCASIAN BEES AND QUEENS. Extra good workers and very gentle. 2 lb. with queen $3.50; 3 lb. with queen, $4.50. Untested queens, 1 to 25, each $1.00; 25 up, 90c. Satisfaction guaranteed. Black River Apiaries, Elliott Curtis, Mgr., Currie, N. C.

YANCEY HUSTLERS, Three-band Italians—bred for business. Select queens, $1.00 each; $8.00 per dozen. Guaranteed to please. Caney Valley Apiaries, 2500 Nichols, Bay City, Texas.

GOLDEN ITALIAN bees and queens. Real yellow and very gentle. 2 lb. with queen, $3.50; 3 lb. with queen, $4.50; Select untested queens, 1 to 25, $1.00; 25 up 90c each. Satisfaction guaranteed. Carolina Bee Farm, Graham, N. C.

EARLY PACKAGE BEES. Prompt shipment begins May 10th. Two-pound package and queen, $5.50 postpaid. Three pound package and queen, $6.60 postpaid. Choice Italian queen, $1.25. Safe arrival guaranteed. Health certificate furnished. Birdie M. Hartle, Reynoldsville, Pa.

OUR QUEENS are Italians of the Geo. W. Moore strain, are line bred and purely mated. For the remainder of the summer our prices will be 75 cents each, in any numbers. Hanson, Hall Bee Co., Livingston, Alabama.

GOLDEN QUEENS, $1.00 airmail; 24 to 49, 90c; 50 and up, 80c. O. E. Brown, Rt. 1, Asheboro, N. C.

NORTHLAND ITALIAN QUEENS.—For production. $1.00 each. 10 up 90c. Shirl Baker, Rodney, Michigan.

THREE-BANDED ITALIAN bees and queens, good workers, and very gentle. We specialize in queens. 2 lb. with queen, $3.50; 3 lb. with queen, $4.50. Select untested queens, 1 to 25, $1.00 each; 25 up, 90c each. Write for prices on larger lots. Satisfaction guaranteed, prompt service. Phone 4703. Alamance Bee Company, Geo. E. Curtis, Mgr., Graham, N. C.

HELP WANTED

WANTED—Two helpers for the honey season. Must know how to drive trailer truck. Ephardt Honey Farms, Strandburg, South Dakota.

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HONEY PLANTS our specialty. Catalog on request. Pellett Gardens, Atlantic, Iowa.

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MAGAZINES

WESTERN CANADA BEEKEEPER—Official organ of the Manitoba Beekeepers' Association. One year, $1.50; two years, $2.25; three years, $3.00. In combination with Gleanings in Bee Culture, $2.75. 211 Affleck Bldg., Winnipeg, Canada.

THE BEE WORLD, international and scientific journal on bees and beekeeping, with apicultural abstracts. Monthly, including membership in the Apis Club, $1.75 per annum. Specimen copy 12c U.S. postage stamps, from The Secretary, The Way's End, Foxton, Royston, Herts, England.

Read the South African Bee Journal. Published every two months. Subscription 7/6 per year to the Treasurer, P. O. Box 3306, Cape Town, South Africa.

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	1-49	50-99	100-up
2 lb. w/q	$3.50	$3.25	$3.00
3 lb. w/q	4.50	4.25	4.00
4 lb. w/q	5.25	5.00	4.75
5 lb. w/q	6.00	5.75	5.50
Italian queen	1.10	1.10	1.00

Packages are shipped with full liberal over-weight and live arrival guaranteed. Our dealings with you must be 100% satisfactory. Replacement or refund on any shipment when bad order receipt is received by us. Our queens are second to none in performance. Queens clipped on request and sent airmail postpaid.

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Write for prices on pkg. bees.

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High Quality Italian Queens

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Our 1951 crop of Michigan clover honey should be ready for the market in July. Dealer: if you want clover honey of the best quality, get on our mailing list, and we will keep you advised on crop conditions, and prices for the coming season.
Address E. D. Townsend & Sons, Northstar, Michigan. The BEST known name in HONEY PRODUCTION.

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ANGORA GOATS
INTERESTED in Angora Goats? Read the Sheep and Goat Raiser, Hotel Cactus, San Angelo, Texas, the only ranch magazine published serving the Angora Goat industry. Subsciption—$1.00, sample copy fifteen cents.

QUEENS

YORK'S QUALITY BRED ITALIAN QUEENS
The Strain that Leading Honey Producers Prefer

1 to 24	25 to 99	100 up
$1.00 each	85c each	75c each

None better regardless of price

York Bee Co.
Jesup, Georgia
(The Universal Apiaries)

John M. Davis Strain Italian Queens

1-24	24-up
$1.25	$1.20

Daughters of ABBA Tested Stock

1-24	24-up
$1.50	$1.40

LITTLE APIARIES
Shelbyville, Tenn. P.O. Box 122

Protect Your Future. Buy Your Extra Savings Bonds Now.

Howard Weaver's Caucasian Queens

1 - 24 $1.00 25 - 49 $0.90 50 up $0.80
No charge for clipping or marking.
Air mailed on request.
Howard Weaver **Navasota, Texas**

ITALIAN SUNKIST KELLEYS ISLAND

Light-colored Italians or Kelley's Island Hybrids.

Queens clipped, airmailed and postpaid; Packages FOB.

2-lb. w. queen, $2.50 4-lb. w. queen, $4.30

3-lb. w. queen, 3.40 Queens, each .65c

Sunkist Bee Company Convent, La.

BETTER BRED QUEENS THREE BANDED ITALIANS

Watch those failing queens and poor colonies. Be sure and replace them with our Better Bred Stock and watch them pay off.

QUEENS — — 60c Each

Calvert Apiaries Calvert, Alabama

Italian Queens – – Queens

Nice large, laying queens

1-99, 55 c each 100 up, 50 c each

Mitchell's Apiaries Bunkie, La

Good Queens

75c each.

J. F. McVay

Jackson, Ala.

Bring Your Dreams Down to Earth
Buy U. S. Savings Bonds

GET THEM WHILE YOU CAN!

Mail Order Prices

We have available the following bee supplies which our inspectors have not passed as first line quality — these are the same as our pre-war mail order brand — slight defects in the material make these great savings possible for you.

This is Offered as "Mail Order Grade"

C-2	Full Depth Supers, empty, 5's	$8.30 per carton
C-13	Shallow Supers, empty, 5's	5.20 per carton
D-2	Beeway Supers, empty, 5's	5.35 per carton
B-2	Metal Covers with Inner Covers, 5's	11.10 per carton
B-13	Bottom Boards, 5's	6.15 per carton
G-6	Standard Frames in 100's only, long top	10.85 per carton
G-16	Standard Frames in 100's only, 2-piece bottom bars	10.85 per carton
G-22	Shallow Frames in 100's only, long thin top	8.50 per carton
H-3	50 Sheets Root 3-Ply Foundation (slightly damaged)	7.25 per carton
H-4	200 Sheets Root 3-Ply Foundation (slightly damaged)	28.00 per carton
	1950 ABC & XYZ of Bee Culture (slightly damaged) does not affect value of book	2.50

Available From Medina Only

Mail, Freight, and Express Charges Extra

Net Cash with Order — No Discounts

We reserve the right to return your cash if our stock is exhausted when your order is received.

The A. I. Root Company Medina, Ohio

Important Notice

We are carrying on the glass jar business of the A. I. ROOT CO. OF CHICAGO. The former manager of that company, Mr. Stanley A. Gill, is now with us as Sales Manager of our Honey Container Division. We stock in our large Chicago warehouse all of the glass honey jars most used by beekeepers and honey packers in this area. Write, or come in to see us.

Partial Price List:

1 lb. standard round jar, 98c per case of 24, or $5.70 per gross.

3 lb. quart, standard round jar, 80c per case of 12, or $9.00 per gross.

5 lb. pail, standard round jar, 60c per case of 6, or $13.68 per gross.

All prices include caps.

Send Post Card for Complete List and Quantity Discounts.

W. BRAUN COMPANY
300 North Canal Street
Chicago 6, Illinois

BEE LINES TO THE EDITOR

(Continued from page 388)

but the veriest tyro will of course know that the cell is capped over when feeding of the larva is completed, i.e., on the eighth day after the egg was laid, or five days after the egg was hatched."—British Bee Journal, April, 1951.

[We do appreciate your calling attention on page 268 of the British Bee Journal, to a 'slip' in the legend beneath the illustration of eggs and brood in various stages, page 94, in the February, 1951, issue of Gleanings. We had not noticed the error and it is a wonder others had not called attention to it. The picture and legend were taken from our

(Continued on page 445)

Hollopeter's Queens

Hardy, Hustling, Honey gathering Italians. Reared on top of the Alleghany Mountains and bees winter on summer stands with no packing. Queens, $1.00 each. Quantity prices on request. Good stock, prompt service.

White Pine Bee Farms
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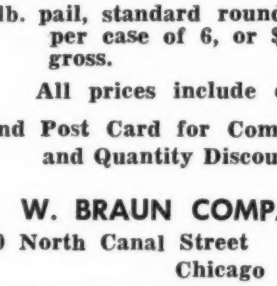

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Make a Date with Comb Honey

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Honey In The Comb

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Here is an easy to read complete book devoted entirely to producing money-making comb honey. Lots of pictures and every problem covered. If you are after the comb honey money, buy this book and do it right. Mr. Killion has led in comb honey production for 25 years. Here is all that experience for only $3.00 postpaid.

Gleanings in Bee Culture
Medina, Ohio

PRIVET AS A HONEY PLANT

(Continued from page 409)

dry seasons, the set of privet berries has been negligible.

Privet for Hedges

Aside from providing bee forage, the privet should serve as an excellent fence-row plant since it is readily propagated from cuttings and from seed. All too few of our farmers (I have several relatives and friends who are either farmers or are closely allied with the farming industry) seem to realize that their mounting costs for insect control are pretty well in direct proportion to the number of fence rows being destroyed in the current fad for such destruction of the natural shelter of the bird life which formerly helped to keep the pests in check. The argument that two to five percent more land can be cultivated when no fence rows are present is true enough, but what good is such an increase when the cost of fighting the increasing numbers of pests cuts crop profits to an extent equalled by an actual reduction of two to perhaps ten percent of cultivated land? This amounts to more work for the same or smaller profit. I wish that every farmer might be persuaded to read the condensation of Louis Bromfield's "Pleasant Valley" which appears on page 51 of the Nov. 1945 issue of Readers' Digest under the title, "My Ninety Acres". Herein lies an excellent example of the value of heavy fence rows.

I do not expect privet to take the place of any present honey plant, but I hope that it may become better and more widely known as it certainly deserves to be on the basis of the quality of its honey alone.

TOO LATE TO CLASSIFY

FOR SALE: Furniture, 250 section supers, $50; sawed and veneer dividers. Elges, Griswold, Iowa.

FOR SALE—60 colonies bees. Must be sold at a loss, with or without full equipment. A bargain because of sickness. George F. Metcalf, Main P. O. Box 559, Grand Rapids, Michigan.

FOR SALE—Junior Brand capping melter. W. E. Limbach, Silt, Colorado.

3-WAY HYBRID QUEENS

Requeen your colonies with the queens developed on Kelley's Island, Ohio.

We have recently received new breeder queens and plan to have queens available all fall.

Do not confuse these queens with other hybrids. Specify Kelley's Island 3-Way Hybrid or Regular stock postpaid.

1-26	$1.00 each
26-100	.90 each
100-up	.85 each

We wish to thank our many customers for the nice business given us this spring. If you were pleased, tell others, if not, tell us. It is our desire to please.

Rossman & Long

P. O. Box 133, Moultrie, Ga.

BEE LINES TO THE EDITOR

(Continued from page 444)

leaflet, 'The City of the Bees', and will be corrected when more are printed.—Ed.]

* * * * *

"Reading what Howard J. Rock, Dale, Wisc., says, May issue, this is the most sensible article that I have read in a long time. He sized up swarming to a tea—less methods and more common sense.

"Maybe if more of these bee enthusiasts would fall in to the creek with a swarm of bees they could do a better job of writing.

"More power to you, Mr. Rock." —E.I.C.,Wash.

* * * * *

"The use of guinea hens for 'night watch' for the apiary, as referred to in the February issue, is a splendid idea and this may yet be found practical for tthe outyards, with a man sleeping among the hives."—J.H.S., Nebr.

Look for this Sign
When you Want
QUALITY AT LOW COST

Trade Mk. Reg.
U. S. Pat. Off.

KELLEY — "The Bee Man"

QUEENS

The package season is now over and we have a surplus of fine young Kelly Island Improved Hybrid queens, fresh daily from your Louisiana bee farm.

Each by prepaid air mail from Paducah **75c**

Lots of 25 and more, 65c each.

Walter T. Kelley Co., Box 210, Paducah, Ky.

LADYLIKE

Mountain Gray Caucasian Bees

produced over a 200-pound average in a 1000-colony outfit during 1950.

They will produce record crops for you if properly handled. Our circular "How to Handle Caucasian Bees" is free on request. Select untested Caucasian queens, 75c each after June first. Health certificate with each shipment.

Caucasian Apiaries Castleberry, Ala.
Rt. 1

KNIGHT'S

Three-Banded Leather-Colored Italan Bees and Queens

Prompt service, full weight packages, young laying queens, and your satisfaction guaranteed.

	Queens	2 lb.	3 lb.	4 lb.	5 lb.
1-24	$1.20	$3.50	$4.50	$5.50	$6.50
25-49	1.10	3.25	4.25	5.25	6.25
50-up	1.00	3.00	4.00	5.00	6.00

For queenless packages deduct the price of the queen.
No Charge for Clipping

John T. Knight
Hayneville, Alabama

Queens Our Specialty
Italian, Caucasian, and Carniolans
Three Isolated Mating Yards to Prevent Mixing Breeds

ITALIANS .....$0.90 each
Caucasians ..... 1.00 each
Carniolans ..... 1.25 each

Italian queens after June 1st, 60c each, any number.
All Queens shipped by Air Mail and guaranteed to please.

Walter D. Leverette Apiaries
Box 364 Fort Pierce, Florida

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Introductory Offer — Six Months $1.00
Single Copy Current Issue 20c

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Fourteenth Year of Publication

Package Bees and Queens
Jackson Apiaries
Funston, Georgia

DONE IT AGAIN

Summer Prices

Merrill's quality Bees and Queens are backed with 100 per cent Satisfaction Italians only.

2lb. packages with queens,	**$2.00**
3lb. packages with queens,	**2.50**
Improved D.R. Queens, untested	**.50**
Tested queens,	**1.00**

Our 30th year as shippers of bees and queens.

Merrill Bee Company

P. O. Box 115

State Line, Miss.

Once Again
JENSEN'S

"Right Now Service" on Queens

We are aware that delay means disappointment and inconvenience, but there are times when orders exceed our supply, temporarily. We try to anticipate our sales potentiality, but this season has surpassed our expectations in volume, and we have found ourselves short in spite of increased output. There is satisfaction in knowing one's products are desired by the trade, and we look with confidence to the future possibilities of beekeeping.

Your choice of Two Outstanding Strains:

"Magnolia State" Italians Our Old Reliables		Dadant's Stock Starline Hybrids, D.R. A Development of Merit
1-24	$1.00	$1.20
25-99	.90	1.10
100-up	.80	1.00

Clipped & Marked Free

Jensen's Apiaries
Macon, Mississippi

BESSONET'S "GULF BREEZE" ITALIANS

There is no substitute for productive stock. We invite you to compare "GULF BREEZE" with any on the market so you will be convinced that our stock really produces.

Prices: 1-24 . . . 80c **25 or more . . . 75c air mailed.**

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THRIFTY QUEENS

Three-Banded Italians Only

Lots of 100, $50.00

Smaller lots, 60 c each

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Bright 3-Band Italians
Quality Plus Service

Only good quality packages pay profits. Poor packages are expensive at any price. Our 30 years' experience in queen rearing and package shipping assures you quality and service that you can depend on. Safe arrival, health certificate, satisfaction guaranteed in U.S.A. and Canada.

Prices:

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3-lb. package with queen	**3.75**
Untested queens	**.90**
Tested queens	**1.75**

All package bees are shipped express FOB. If wanted shipped parcel post add postage.

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